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JULY 1959

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# FOOD ENGINEERING

FOR MANAGEMENT
IN MANUFACTURING,
PACKAGING, MARKETING

A McGRAW-HILL PUBLICATION

GF uses Gas Chromatography in flavor improvement

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# FOOD
FOR MANAGEMENT

JULY 1959

VOL. 31 NO. 7

30th YEAR



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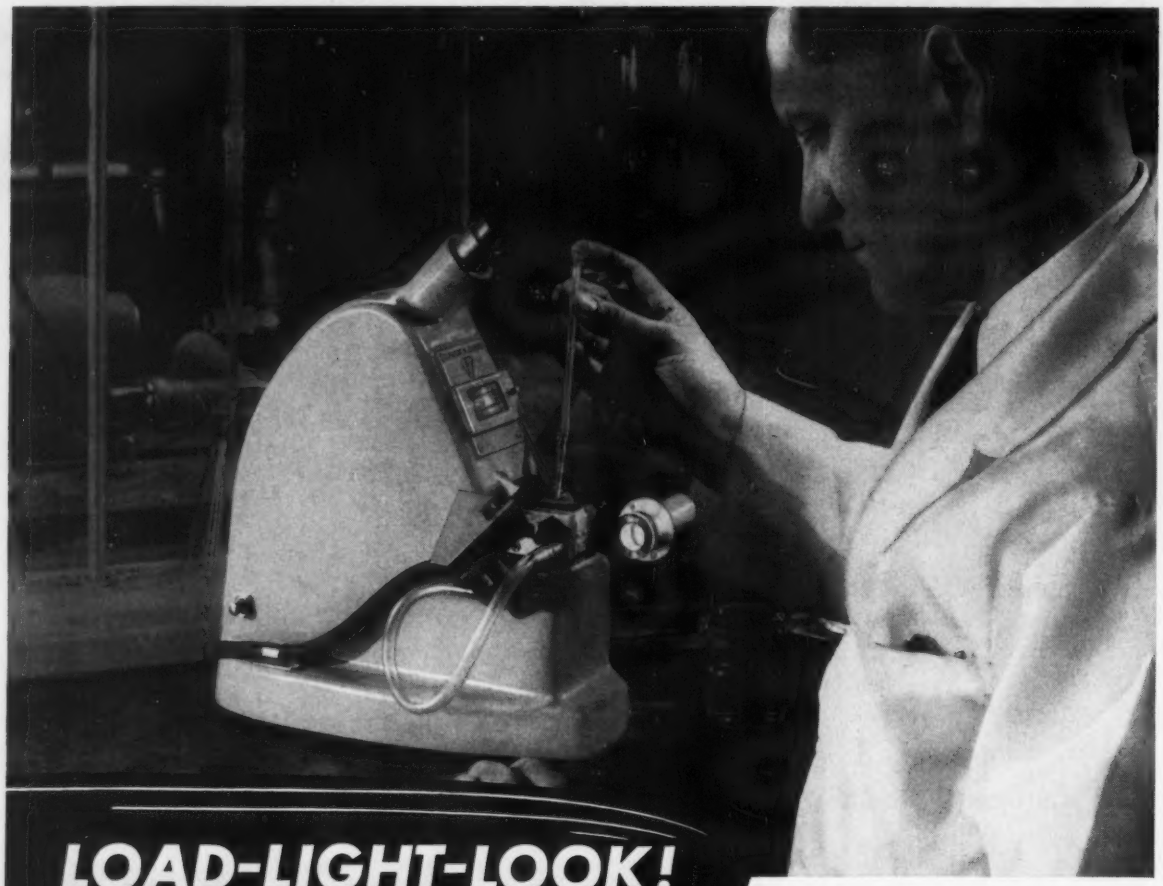

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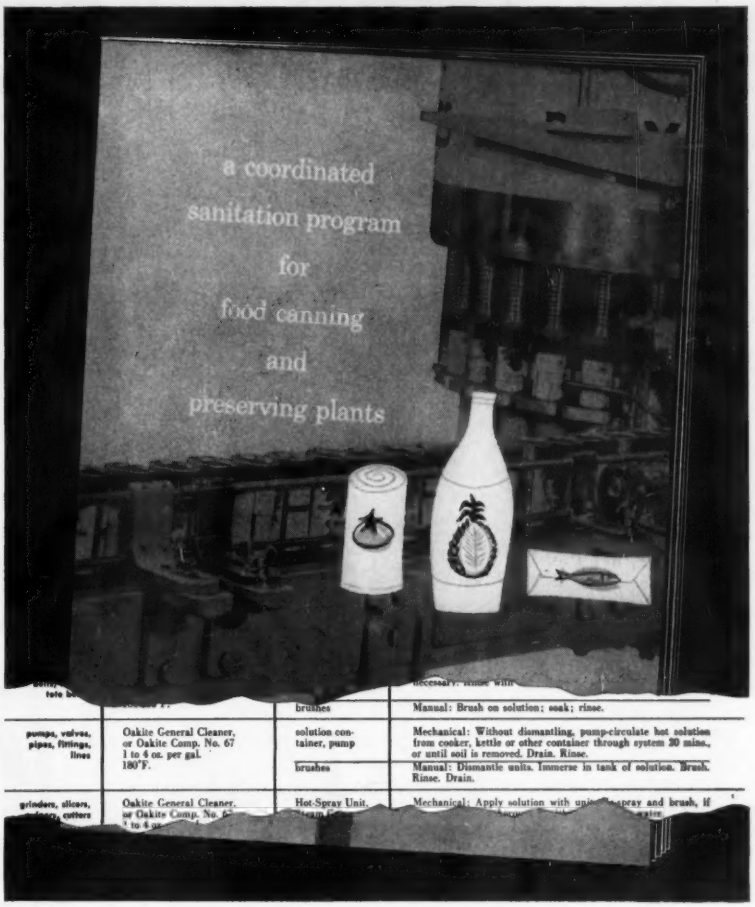
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and
preserving plants
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brushes
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Detailed data charts in this bulletin give latest advanced techniques for cleaning and sanitizing food processing facilities. They describe the detergent, solution strength, solution temperature, application equipment and one or more recommended methods for solving more than 20 different *types* of cleaning problems. See example above.

Other sections discuss Sanitation, Detergency, Conveyor Chain Lubrication, Mechanized Cleaning. Helpful, factual literature like this is just one of the Big Plus factors you get when you deal with your local Oakite man. Send for your free copy of *A Coordinated Sanitation Program for Food Canning and Preserving Plants* today! Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

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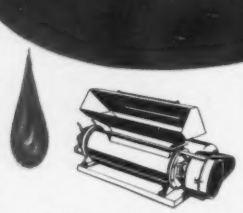
years' leadership in industrial cleaning

# How FMC "matched set" equipment improves efficiency and profits in tomato processing

Any golfer knows that a matched set of clubs, tailored for him, will improve his game. The same thing happens when processors install "FMC matched equipment" for whole pack tomatoes, juice or other tomato products. Each highly-specialized piece complements the rest—in basic design, space requirements, construction, capacity, speed and ease of operation. Results: You increase product recovery, savings and efficiency all along the line. Most important, your pack will show the difference, in consistent quality and profits. Write for details or call your nearest FMC representative. Do it today.



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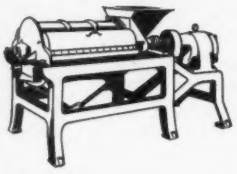

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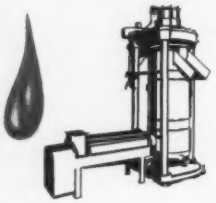

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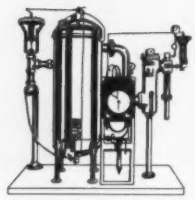

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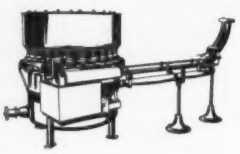
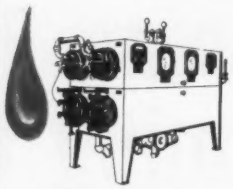


FMC JUICE FILLERS



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FMC HIGH-PRESSURE TOMATO LINE

FMC JUICE EXTRACTOR

## *Other FMC Tomato Equipment Includes:*

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# TRENDS & FORECASTS

SPECIAL

FOOD ENGINEERING

SERVICE to EXECUTIVES

**Retail food store sales amounted to $12.4 billion in first quarter** of '59, up 3% in value and 4% in tonnage, GMA reports.

**Retail food prices at midyear are no higher than in '52,** and standard family market basket of farm foods can be purchased for less than 40 hr. of work per month, 22% less than in '52.

**Hourly wage rates in food factories continue to advance,** amounting to $2.09 in April, or 7¢ higher than year earlier. Weekly wage averaged $84.23, up $4.43 over '58, while work week increased only ½ hr.

**Export of crude and manufactured foodstuffs totaled $5.8 billion** for the first quarter of '59, 7½% higher than in same quarter of '58.

**Automatic vending machines sold $18½ million of hot foods last year,** an increase of 178% over '58. Most of it is vended in cans.

**More competition from retail chain brands may be expected** as result of new regional advertising now possible in three national consumer magazines.

**Margarine consumption will rise to 9.2 lb. per capita** this year, with butter remaining at 8.4 lb., USDA forecasts.

**Record beef production is seen in '60, with marketing up 4% this fall.**

**Market for pickles and relishes is growing 5 times as fast as population.** Last year's pickle pack exceeded 46 million cases.

**Shipments of metal cans in '59 first quarter increased for beer and soft drinks,** but declined for fruits and vegetables, certain dairy products, fish and seafood, Can Manufacturers Institute reports.

**Ice cream production for first 4 months of '59 rose 7% over year earlier,** to 200 million gal.; ice milk, +6% to 27 million; sherbert, +6% to 9.2 million; Mellorine, +10% to 12 million; water ices, +16% to 6.6 million.

**Production of evaporated whole milk was 675 million lb., up 2%,** for first 4 months of '59 compared to same period in '58. Spray-dried nonfat milk gained slightly at 555 million lb. Dry whole milk was off 2% to 28 million lb.

**Retail Sale of frozen baked products increased from 19 to 31 million lb.** between '54 and '58. Consumption of frozen unbaked fruit pies jumped from 27 to 125 million lb.

**Value of canned fish produced last year was $388 million, up 15% over '57.**

**Contrary to some reports, Cuban sugar production this year** will be only 5.5 to 5.8 million Spanish long tons, in opinion of B. W. Dyer & Co.

**Soft drink sales last year were 0.1% below the '57 level** because of weather conditions, but value of sales was up 6% to $1.36 billion, ABCD reports.

**Americans drank 35.2 gal. of fresh milk per capita in '58, same as in '57.** Coffee consumption was up 0.6 gal. to 28.7. Tea dropped 0.1 gal. to 6.8. Beer was off 0.3 gal. to 14.8. Wine remained at 0.9 gal.

**Thornton Canning Co. was bought by Calif. Canners & Growers because** "this kind of merger is best way to remain in business in face of competition, buying practices, and private labels."

**See Developments to Watch p. 11**

## *Radioisotope tests prove*

# THE HIGH BACTERIAL CLEANABILITY OF STAINLESS STEEL

Are you concerned with cleanability and sanitation in the processing or packaging of food, meat, fish, dairy, or beverage products? Then you will be vitally interested in these results of radioisotope tests on bacteria removal conducted at The University of Michigan.

*Tests on worn or scratched surfaces*— Stainless steel proved to have the highest cleanability, over china, glass, plastic, and aluminum.

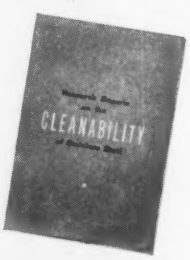
Worn stainless steel surfaces had the same high cleanability as new stainless surfaces.

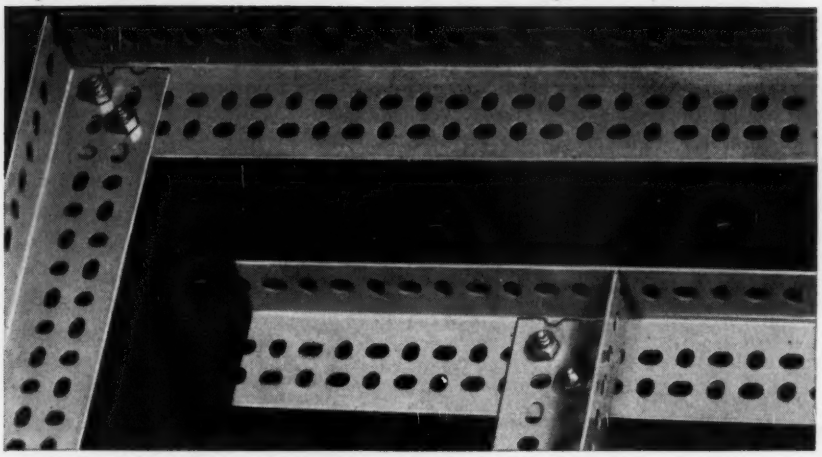
Stainless steel proved superior because, unlike softer metals and other materials, it is tough and dense. It offers high resistance to denting, scratching, and abrading. Stainless is a solid, uniform metal all the way through. It provides maximum cleaning, non-contaminating, corrosion-resisting qualities at every depth.

*Tests on unworn surfaces*—Stainless steel equaled china and glass, and was superior to plastic and aluminum.

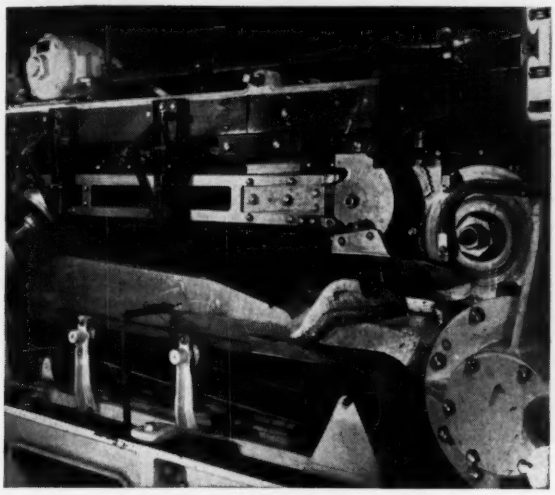
The use of stainless steel in any food processing or packaging operation promotes better sanitation, provides easier cleaning, requires less down time, reduces maintenance, extends equipment life, reduces costs.

*Want more facts?* Republic offers this FREE BOOK "Research Reports on the Cleanability of Stainless Steel". Send coupon for your copy. Ask for ADV. 686C.

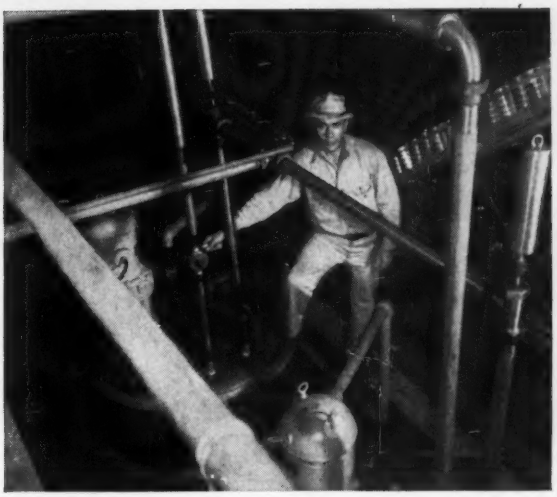




**REPUBLIC METAL LUMBER® OFFERS UNLIMITED APPLICATIONS** for building catwalks, storage racks, and other storage facilities. Republic METAL LUMBER is made of heavy gage steel, Bonderized after fabrication, and finished in gray baked-on enamel. It is the fast, economical, versatile steel building material that is as easy to use for framing as common lumber. Simply measure, cut, and assemble with standard nut and bolt fasteners. Delivered in bundles of 10 pieces in 10-foot or 12-foot lengths. Send coupon for attractive catalog of ideas.



**REPUBLIC TITANIUM PROVIDES MAXIMUM PROTECTION** against the corrosive action of salt and brine. Fish, meat, and food processing equipment fabricated from Republic Titanium is impervious to the pitting action and corrosive effect of salt water and brine. Titanium equipment is easy to clean and easy to handle. It is as strong as steel, yet weighs only 56% as much. Republic is working closely with food equipment manufacturers on new developments utilizing all the advantages of titanium. Send coupon for more details.



**REPUBLIC ELECTRUNITE® STAINLESS STEEL TUBING** is ideally suited for sanitary tubing applications. Outstanding corrosion-resistance and a wide range of resistance to temperature, pressure, and physical damage mean that ELECTRUNITE will last indefinitely. Every foot is uniform in wall thickness, of uniform diameter, and meets every requirement called for by ASTM and ASME specifications. It is available with O.D. polished, I.D. polished, or both, in a complete range of sizes. Contact your ELECTRUNITE representative, or mail the coupon for more information.

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***Chevy's the biggest saver on tight, guaranteed hauling schedule***

# "Chevrolet trucks do better by us than any other truck that we've tried."

—W. H. MERRILL, JR.,
MERRILL MOTOR LINES,
FORT WORTH, TEXAS

"If we miss our scheduled delivery times, we'll lose our contracts," says Mr. Merrill, whose firm guarantees on-schedule deliveries of perishable foods throughout Texas, Oklahoma and New Mexico. "Our Chevrolet trucks have never let us down.

"The big Chevrolet V8 we've got on the run from Oklahoma City has been terrific! It's got over 60,000 miles on it and all we've had to do to it is to change plugs. The maintenance cost on this V8 is only $.002 per mile over a three-month period. Chevrolet trucks do better by us than any other truck that we've tried. They've got all the performance we or anybody needs."

Chevy, you'll find, is winning a lot of new boosters among food distributors, for a number of good reasons. Reasons like money-saving power, for instance. Chevrolet for '59 offers newly improved valve-in-head 6's that nurse a gallon of gas like nothing in trucks has before. Or big V8's for every Series that give you the shortest stroke design—the best saving design—in the field. And for the toughness that leads to low maintenance, Chevrolet's advanced chassis components are specially designed for the capacity to out-muscle the roughest kind of runs. For the latest in low-cost hauling equipment, see your Chevrolet dealer! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET

## No job's too tough for a Chevrolet truck!

# DEVELOPMENTS TO WATCH

**SPECIAL FOOD ENGINEERING SERVICE to EXECUTIVES**

See Who's Building What p. 13

Washington Report p. 17

**Full-color lithography now can make corrugated cases effective** display containers. It is applied to outside liner before combining with corrugated board. Progress Lithographing Co. perfected technique.

**Heat-pump system eliminates boiler in milk concentrating and drying plant.** Refrigerant compression heat is applied to process, with heat from cooling jackets of gas engines that drive compressors.

**Preheating of milk containing cheese starter bacteria cultures** controls attack on bacteria by viruses and reduces cheesemaking failures, USDA finds.

**Highly sensitive vapor fractometers, with capillary columns** and ionization detectors, have been introduced for gas chromatography. These will pick up components at level of $10^{-9}$ grams.

**Champagne is semi-automatically disgorged at rate of 1,000 bottles** per man-hour by new German machine at Paul Masson Vineyards.

**Continuous moisture recorder for dry materials** is announced by Brabender.

**Trash fish can be eviscerated and scaled quickly and economically** by enzymes in process developed by Texas Engineering Experiment Station.

**Vibration is combined with flotation in new machine that removes meat** from poultry necks and backs for use in chicken pie, soups, and croquettes.

**High quality take-home-and-eat prepared foods, from appetizers to desserts,** will be delivered fresh daily by Schrafft commissary to "Quality Isle" display in Bohack's Manhasset, N. Y., supermarket. In this new move to take housewife out of kitchen, 201 items will be sold.

**Wide choice of food colors that are odorless and tasteless,** will not bleed, are resistant to oxidation and light, is result of FDA approval of lakes of FD&C colors for all foods. Before, only 3 pigments were OK.

**Award of $1,000 will be made to person submitting most outstanding** technical contribution to soft-drink field before Dec. 31, ABCB announces.

**Bulk materials handling is speeded with new palletized cylindrical bins** 9½ ft. tall and 5¼ ft. in diameter. Bins are filled by retractable chute, moved by

*(Turn page)*

## *Flies Overseas to Put FE Focus on Europe*

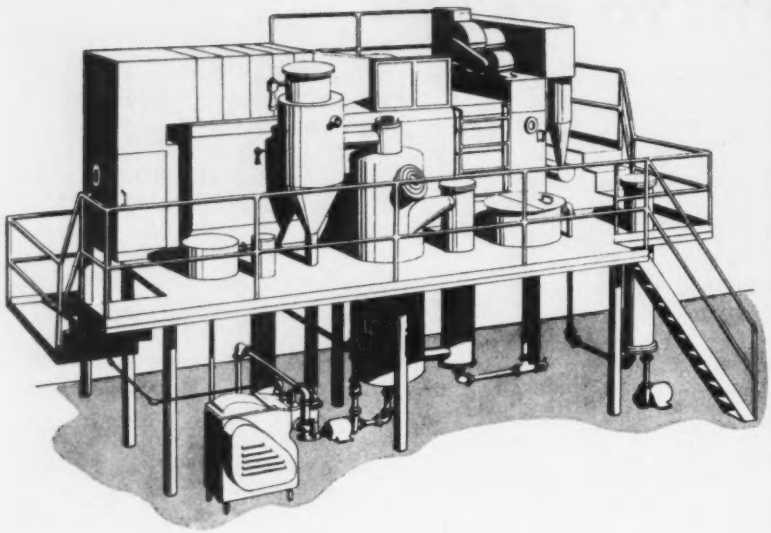
**Popping up** on the 'other side' are food developments aplenty that bear watching by the 'whole man.' —And as you read these lines, FE's Editor Lawler is swinging over the Continent sharply yardsticking them for you.

He's checking Europe's culling of age-old methods. . . Its readiness for new and radical approaches. . . The vital implications of those easier costs and less-pressing labor. . . The moves, meanwhile, of U. S. firms to set up on foreign soil.

—In short, all the new-day technical and economic trends now tying us closer across the jet-shrunk Atlantic.

Six countries he's visiting in all—first sitting in on the Lausanne International Food Congress. ▶ **Watch for his keen reports in upcoming FEs.**

**Editor Frank K. Lawler. . .** Traces FE pulse-taking trip.



*The* **BLAW-KNOX MILK DRYING PILOT PLANT WITH CAPACITIES UP TO 175 POUNDS PER HOUR**

**NOW LARGE DAIRIES CAN RESEARCH SPECIALTY PRODUCTS . . . SMALL DAIRIES CAN SOLVE SEASONAL SURPLUS PROBLEMS**

All in one "package" the evaporator and spray dryer are shipped to you complete with milk preheater, storage tank, high concentrate heater, surge tank, high pressure pump, sifter and all inter-connecting sanitary piping. Easy reassembly eliminates field welding. Fitted at factory, shipped to you ready for steam, water and electrical connections. Built to Sanitary Dairy 3-A standards, the "Pilot Plant Package" will handle all types of dairy products, non-fat milk, whole milk, whey, buttermilk, dietetic foods and others. Ask for Bulletin 590 for more details and specifications.

BLAW-KNOX

**BLAW-KNOX COMPANY**
*Dairy Equipment Division*
*Mora, Minnesota*

lift-truck, and dumped by hydraulically operated hinged platform.

**Frozen concentrated lemon punch in pineapple, raspberry, and strawberry** flavors is announced by Sunkist. Libby has pineapple-raspberry concentrate.

**Frozen concentrated coffee in spray container is innovation by Kwik Kafe.**

**Can holding 2 oz. of roasted coffee, for one brewing, is American Can development.**

**New vending machine brews individual cups of coffee from separate** packets and serves beverage in 9 sec.—Rudd-Melikian innovation.

**Special 1-day session on food industry instrumentation will be held** at annual meeting of Instrument Society of America in Chicago, Sept. 23.

**Lipton instant tea is dried at 500 lb. per hr. in Chain-Belt vacuum unit.**

**Heat transfer is increased by frost on refrigerating coils** that cool by natural convection, TRRF reports. Frost increases effective coil area.

**Ion exchange is top '58 technical advance of California wineries.**

**Citric acid is extracted from cotton leaves** in fast, relatively simple Austrian process. Cost is cut 50%.

## Schedule of Events

**July**
9-12—Bakery Equip. Manufacturers Assn., annual meeting; Greenbrier Hotel, White Sulphur Springs, W. Va.
16-17—National Kraut Packers Assn.; Catawba Cliffs Beach Club, Port Clinton, Ohio.
20-22—International Apple Assn., Inc.; Washington Athletic Club, Seattle.

**August**
3- 7—National Dietary Foods Assn.; Olympic Hotel, Seattle.
10-13—National Food Distributors Assn.; Sherman Hotel, Chicago.
11-12—American Soybean Assn.; Sheraton-Jefferson Hotel, St. Louis.
17-21—Gordon Research Conference on Food & Nutrition; Colby Junior College, New London, N. H.
19-26—10th International Congress of Refrigeration; Copenhagen, Denmark.
23-26—National Assn. for Specialty Food Trade, annual show; Hotel Astor, N.Y.C.
24—FD&C Law Div. of American Bar Assn.; Balmoral Hotel, Miami, Fla.
25-28—American Dietetic Assn., annual Meeting; Shrine Convention Hall, Los Angeles.

# WHO'S BUILDING WHAT...

**Monthly Report: Food firms to spend $23,980,329 for expansion**

## Proposed Work

**Ann's Newfield Bakeries,** Bridgeport, Conn., $180,000 bakery.

**Armour & Co.,** Houston, Tex., meat processing and distribution plant. Cost: $2,000,000.

**Associated Grocers,** Springfield, Mo., 1-story warehouse. Cost: $120,000.

**Bowman Biscuit Co.,** Denver, $5,000,000 3-story warehouse.

**Continental Baking Co.,** Denver, 1-story plant to cost $750,000.

**Delinarva Soya Processors, Inc.,** Salisbury, Md., plant to produce soybean oil meal. Outlay: $2,000,000.

**Food Specialties Co.,** Reading, O., $125,000 plant.

**Glidden Co.,** Cleveland, $2,000,000 central research and development laboratory.

**Lava Baking Co.,** Waterbury, Conn., $110,000 bakery addition.

**Palmetto Grape Marketing Assn.,** Inman, S. C., grape processing plant. Cost: $200,000.

**Quaker Oats Co.,** Marion, O., $750,000 warehouse and distribution center.

**Smith & Fazina,** Hartford, Conn., $110,000 warehouse for wholesale meat distribution.

**Stop & Shop,** Readville, Mass., dairy plant and laboratory. Cost: $150,000.

**Universal Beef Corp.,** Roxbury, Mass., meat packing plant to cost $150,000.

## Contracts Awarded

**Benatovitch Bros.,** Buffalo, N. Y., $425,000 supermarket and warehouse.

**Brandywine Mushroom Corp.,** West Chester, Pa., 1-story warehouse to cost $125,000.

**Chino Valley Meat Packing Co.,** Chino, Calif., meat packing plant. Cost: $214,135.

**Coca-Cola Bottling Co.,** North Brunswick, N. J., bottling plant and distribution center to cost $400,000.

**Continental Grain Co.,** Longview, Wash., $370,000 grain storage facility.

**Eugene & William Krohner,** West Hartford, Conn., $115,000 bakery.

**Lawry's Foods,** Los Angeles, $184,000 warehouse and warehouse addition.

**T. J. Morris,** Statesboro, Ga., grocery storage warehouse to cost $130,000.

**U. S. Engineers,** Fort Lewis, Wash., meat cutting and cold storage plant. Cost: $310,665.

**University of Minnesota,** Austin, Minn., Hormel Institute biological laboratory. Cost: $282,748.

**Swift & Co.,** Lebanon, Ky., 1-story cheese plant. Cost: $103,791.

**Texas Brands Inc.,** Pecos, Tex., $345,000 frozen food plant.

**Vilotti's Bakery,** Philadelphia, $125,000 bakery.

**Wilsey-Bennett Co.,** Oklahoma City, butter packing plant to cost $125,000.

## Others

**Baltimore Spice Co.** has begun construction of a new plant at Garrison, Md. Plant will include offices, laboratory, and warehouse.

**Dell Food Specialties** is nearing completion of a building addition to its Beloit, Wis., plant. Addition will boost production by 75%.

**General Foods Corp.** plans to build a carton plant on a 21-acre site at Saratoga Springs, N. Y. Construction will begin this summer, end by summer of 1960. Company will continue to operate its main carton and container plant in Battle Creek, Mich.

**Nestle Co.** has begun construction of its $5,000,000 chocolate plant at Salinas, Calif. Scheduled for completion next year, plant will be 4-stories high and will occupy about 4 acres of a 30 acre site.

**C. F. Powell** has announced construction of a meat packing plant in Wilmington, N. C. that will employ "several hundred persons."

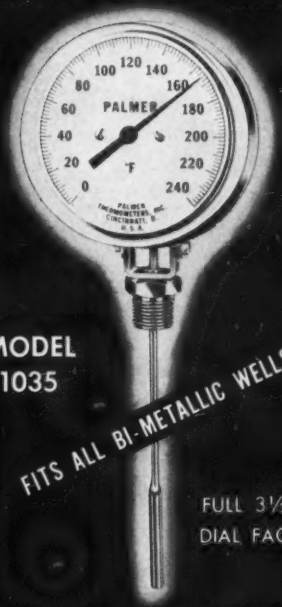
**Rice Grower's Assn. of Calif.** will build Puerto Rico's first rice mill at a cost of $2,000,000. Site chosen for the new plant is Guaynabo.

**Western Canadian Seed Processors, Ltd.,** will build the first full-scale Canadian edible-oil-processing installation at Lethbridge, Alberta. Girdler Process Equipment Div. of Chemetron Corp. will engineer and equip the plant.


Outstanding Accuracy

PALMER

Dial Thermometer




Check these functional features

- Direct-drive Bourdon Coil with a filled system for longer lasting accuracy.
- Stem can be placed at any desired angle and case can be rotated to most readable position.
- External calibration for zero setting.
- Unaffected by stem alignment.
- Accurate to one scale division.
- No sticking at any temperature.
- Non-corrosive case.

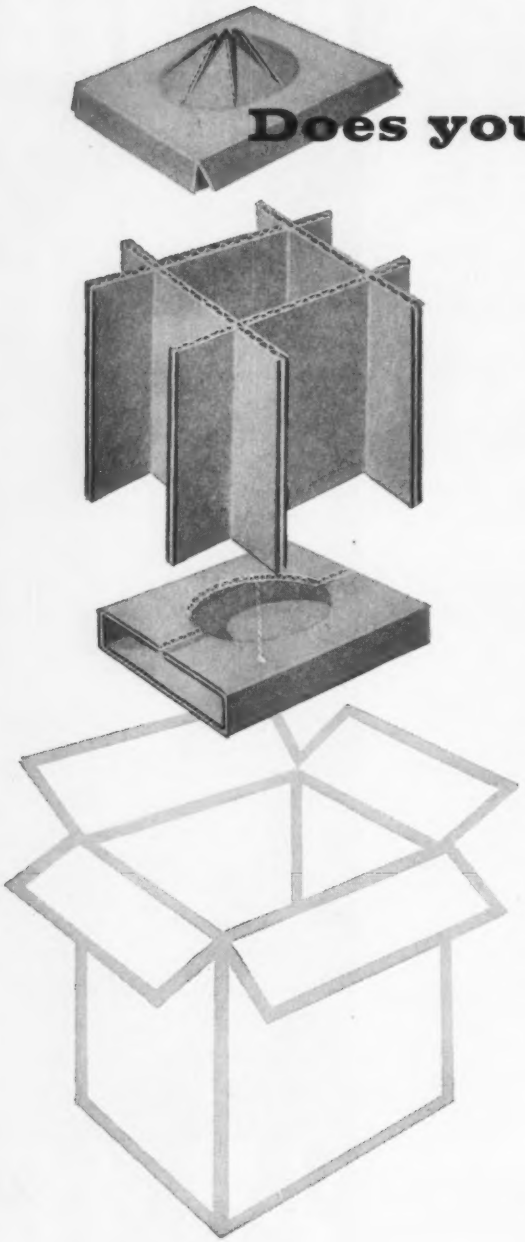
PALMER

THERMOMETERS, INC.

Mfrs. of Industrial Laboratory, Recording and Dial Thermometers

2515 Norwood Ave., Cincinnati 12, O.

*What you should know about*



# Does your corrugated box

For most products, proper interior packing is one of the most important factors in corrugated container design. Through its careful selection you can often prevent a costly chain reaction of damage claims and rejected shipments.

How much and which types to use will depend primarily on your product, its construction, how it is normally handled and shipped as well as the type of protection needed. You may find, for example, that *anchoring* the contents is paramount. Some packing pieces are made expressly for this purpose. Others *cushion* against impact and vibration. Still others are used to *separate* packed units. A fourth groups primary job is to *suspend* the contents within the container.

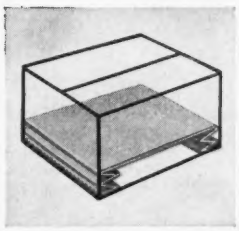
The forms of interior packing are as versatile as the items they protect. A few of the most widely and successfully used types are described here:

**SPRING PADS**

Like innersprings, these accordion-shaped pads help dissipate and cushion shock. Their buffer action absorbs vibration

*interior packing for Union Boxes.*

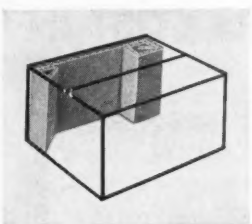
# need an "innerspring mattress"?



which can cause loosening of parts and actual breakage — particularly where it coincides with the natural frequency of the packaged product and sets up harmonic resonance.

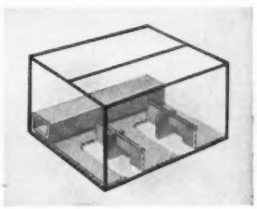
**CORNER PIECES**

These units "round off" the corners of the box's interior—provide extra protection at these vulnerable points. They cushion against crushing caused by improper stacking and impact resulting from humping or switching of freight cars, throwing, dropping and other shipping hazards that might squeeze or otherwise damage the contents.



**DIE CUT SHEETS**

Die cut inner packing comes in an almost limitless range of shapes, sizes, thicknesses. It can be made to perform practically any protective function. The pieces nearly always are tailored around the product—usually a fragile article, an item of irregular shape or one of unbalanced construction. Die cut inner packing is being used increasingly today because of the wide variety of items now shipped in corrugated containers.



Interior safeguards recommended or developed by Union-Camp are saving many companies thousands of dollars annually in packaging costs. Not to mention untold dollars that have been saved through the elimination of shipping damage. Whatever your product, your Union Box representative will be glad to work with you in determining the most efficient and economical approach to your particular packaging operation.

*Write for free, informative booklet "Interior Packing of Corrugated Boxes"*

union camp

**UNION BOXES**

**UNION BAG-CAMP PAPER Corporation**
233 BROADWAY, NEW YORK 7, N. Y.

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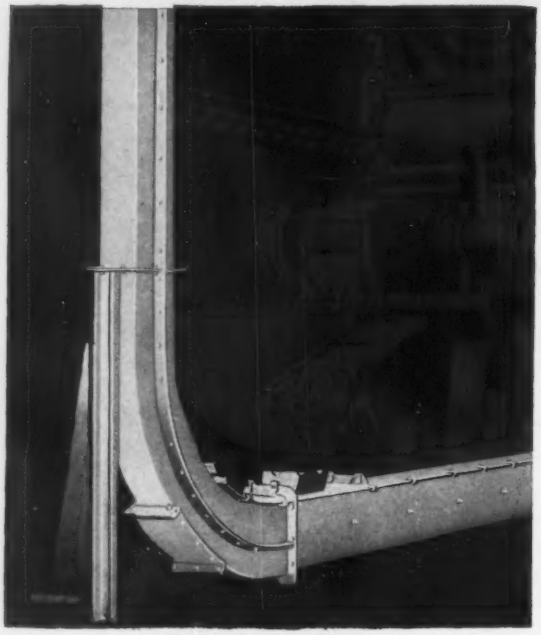
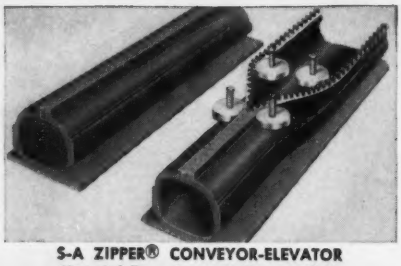
**Sales Offices:** *Eastern Division—1400 E. State Street, Trenton, N.J.*
*Southern Division—P.O. Box 570, Savannah, Ga.; P.O. Box 454, Lakeland, Fla.*
*Western Division—4545 W. Palmer, Chicago, Ill.*

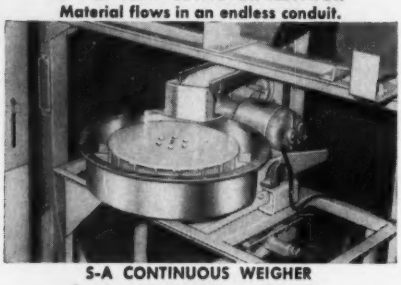
# STEPHENS-ADAMSON



REDLER® Conveyor-Elevator



S-A ZIPPER® CONVEYOR-ELEVATOR
Material flows in an endless conduit.



S-A CONTINUOUS WEIGHER
Continuous accurate weighing for gravimetric feeding operations.

S-A VIBRATING CONVEYORS
Natural Frequency Conveyor

## SPEEDS EFFICIENCY...LOWERS COST IN FOOD HANDLING

When you invest in bulk handling equipment, the true cost is the price divided by years of satisfactory, efficient service. Unless you are presently one of the thousands of users of STEPHENS-ADAMSON Bulk Handling Systems you haven't discovered the most profitable answer to the above formula. STEPHENS-ADAMSON engineers and builds several types of conveyors for the chemical industry, each providing distinct advantages over the other for certain bulk handling situations. Thus, STEPHENS-ADAMSON recommendations are always based — not on a desire to sell a particular type of conveyor — but the most efficient type of system for the requirements involved. To acquaint you with the versatility of STEPHENS-ADAMSON engineering, we are preparing a special book on Food Handling. Write for your copy.

**MORE S-A EQUIPMENT FOR PROFITABLE FOOD HANDLING**

- S-A BOX CAR UNLOADER
- S-A SWIVELOADER® Centrifugal Thrower Units.
- S-A TELLEVEL® Automatic Bin Level Controls
- S-A CURVE CROWN® Pulleys
- S-A CARRIERS
- S-A CAR PULLERS
- S-A SHIP TRIMMER
- S-A FOOD SLICE SEPARATOR
- SEALMASTER Bearings

**WRITE FOR LITERATURE ON FOOD HANDLING EQUIPMENT**

S-A
ENGINEERED BULK HANDLING SYSTEMS
STANDARD MATERIALS HANDLING PRODUCTS
SPEEDWALK® PASSENGER CONVEYORS
SEALMASTER® BALL BEARING UNITS
SPHERICO® BEARINGS & ROD ENDS

**ENGINEERING DIVISION**

**STEPHENS-ADAMSON MFG. CO.**

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PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO

## See Color Bill Moving Through

FDA is hopeful—despite lack of action at this writing—that its color additives bill (sent to the Hill May 29) will be carried through this Congress.

Forecast meantime is an exacting yardstick relative to additives "generally recognized as safe."

Here, it won't be enough, interprets Deputy Commissioner John Harvey, for just a few scientists to give the nod to a color. Rather, its safety must be generally recognized among pharmacologists, physicians, biochemists and other qualified judges.

The bill aims at speeding color testing and setting of tolerances, heretofore unauthorized. And sought is coverage of all colors (not just the coal tars).

## Double-Barreled Pricing Probe

Food interests were under two new Congressional attacks in late June.

**• In the House, Rep. James Roosevelt (Calif.) opened a broad-scale probe of "economic concentration" in the food field, including pricing.**

**• In the Senate, Sen. Kefauver's anti-trust subcommittee launched hearings on "price practices and related matters" in the baking field.**

Scene of the Roosevelt riffling was the House Small Business Subcommittee. Here, Rep. Charles Brown (D., Mo.) charged that large food chains apparently absorbed no part of the increased labor and transportation costs but passed them on to consumers.

Wallace Flint, v-p of the National Assn. of Food Chains, retorted that food costs have dropped 4.4% in the last year, also that chain profits in '57 were but 1.23% of total sales, lower than in previous years.

In the Kefauver sessions, George Graf, general manager of Quality Bakers of America Cooperative, Inc., called for "specific rules" for curbing price and pressure tactics that, he says, "crowd out" small bakeries.

## Spotlight Wax Checks; Curb Vet Drugs

Suspicions that waxes used on food containers might carry cancer-causing agents (FE Mar., p. 19) have now got "headline play."

Report is that traces of 1,2,5,6-dibenzanthracene, a carcinogenic substance, have been found in 4 of 25 waxes submitted by FDA and tested at Chicago Medical School and the U. of Southern California.

No true hazard has been evidenced. But studies will be continued.

Meanwhile, FDA has banned use of new veterinary drugs that "might leave" carcinogenic residues in meat. The older, recognized drugs are presently exempt from check.

## Cubans, U. S. Hit Castro Land Reform

Protests from many of his own farm supporters have somewhat blunted Castro's agrarian-reform arrow.

Further, the drastic aspects of his action triggered a note from Washington—the State Dept. expressing "serious concern" that his move to redistribute lands, including cane properties operated by American interests, menaces the economic stability.

However, the White House, which must propose an extension of the domestic sugar import control law this session, isn't anxious to threaten a retaliation.

First, Washington wants to wait and see if Castro can be persuaded to administer the reform fairly. Second, the Administration will try to avoid sparking an internal U. S. sugar-quota battle between beet growers, cane interests, and companies active in Cuba.

To this continuing Cuba question may be added a new poser—it being reported that Guatemala is considering a similar land reform. This would affect United Fruit interests.

## Regulated Travel for Cooked Frozens?

Frozen food shippers are fighting hard for an official ICC ruling—relative to transporting frozen packed foods.

They want them recognized as "traditionally exempt" from interstate commerce regulations.

The issue stems from the Transportation Act of 1958, in which Government regulations were extended to many truckers not previously covered. Those not regulated, however, got "grandfather rights" whereby they could easily obtain ICC operating certificates.

Such differentiation hasn't made the regulated carriers very happy. They're against legal exemption of cooked frozens. And if they win their point, many shippers would have to switch to the regulateds.

## And Who'll Carry the 'Big Tubes'?

Another wrangle concerns the new giant "toothpaste tube" containers used for hauling such bulk goods as sugar and milk.

Tank-truck operators seek exclusive rights to transport them. In opposition are the common carrier truckers, who contend their services are more suitable and economical for moving the new units.

Specific reference is to U. S. Rubber's Sealdtanks (FE Apr. '58, p. 125). Offered in sizes to 4,300 gal., these polythelene-lined rubber-and-fabric tubes handily fold into minimum space after emptying.

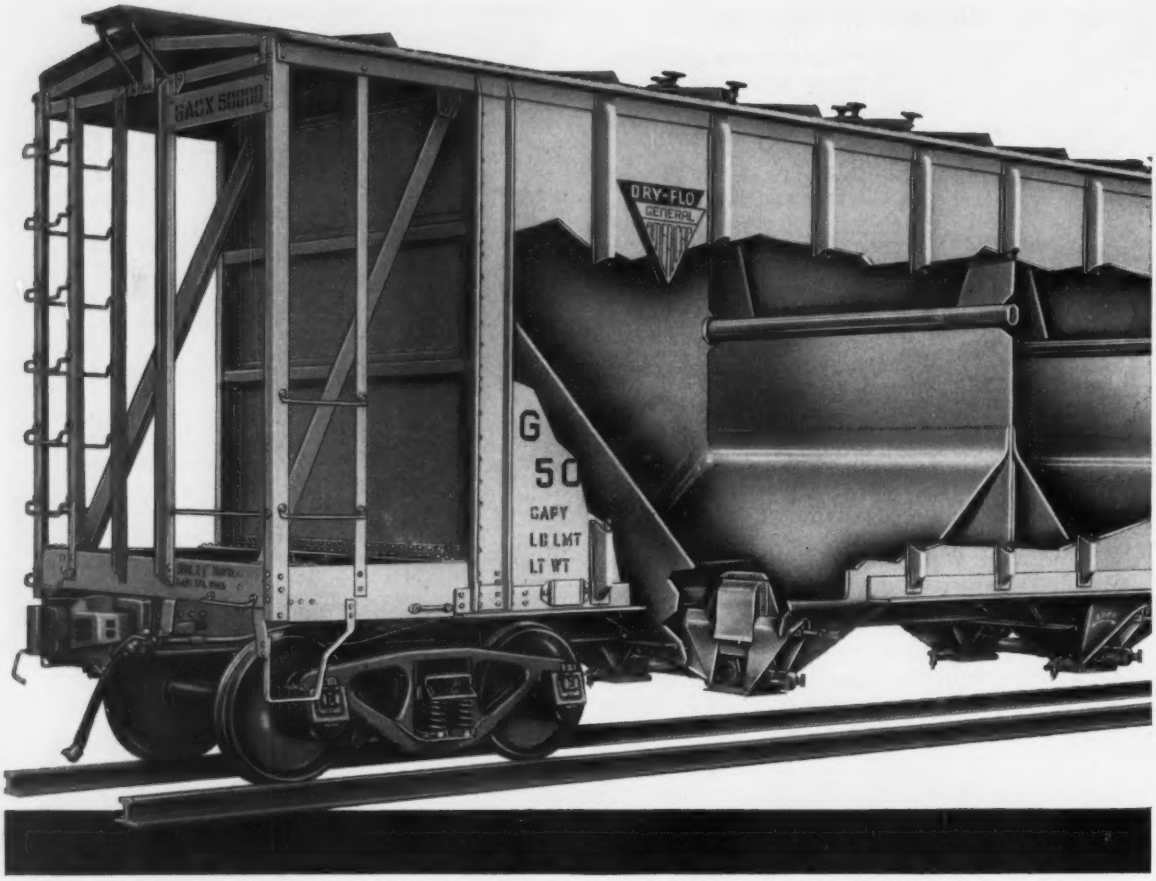
## BRIEFS

**More uniform preparation of Red No. 1** is target in new color move by FDA. Involved is tighter range in boiling of amines for this dye.

**Stepped-up seizures of adulterated foods** mark the new "higher gearing" of FDA, which now has more than 400 working inspectors. A recent month's impounding hit a record 227 tons, mostly wheat that contained mercury and frozen spinch carrying DDT.

**Radioisotopes can be a real boon,** says AEC's Dr. Paul Aebersold, for those making tests of food additives. He points out that these tracers markedly reduce checking time, are highly accurate, and will significantly cut testing costs. (See also FE May, p. 88.)

# smooth interiors of DRY-FLO* CAR



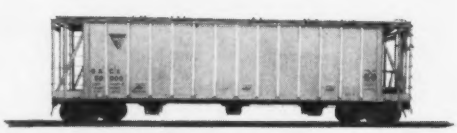

# eliminate hangup points!

• Exterior carlines make possible a smooth ceiling. Hopper corners are rounded to a 2½" radius to allow perfect discharge of lading.

• You can unload the DRY-FLO car pneumatically or mechanically. Greater clearance above rails accommodates all types of unloading equipment at rail siding or team track.

• All-welded construction makes application of interior coating easy when needed.

*Competitive in price with other covered-hopper cars! do so much more!*



*Patent Rights Reserved

DRY-FLO CAR DEPARTMENT
**GENERAL AMERICAN TRANSPORTATION CORPORATION**
*135 South LaSalle Street • Chicago 90, Illinois*
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CIRCLE 19 ON READER SERVICE CARD→

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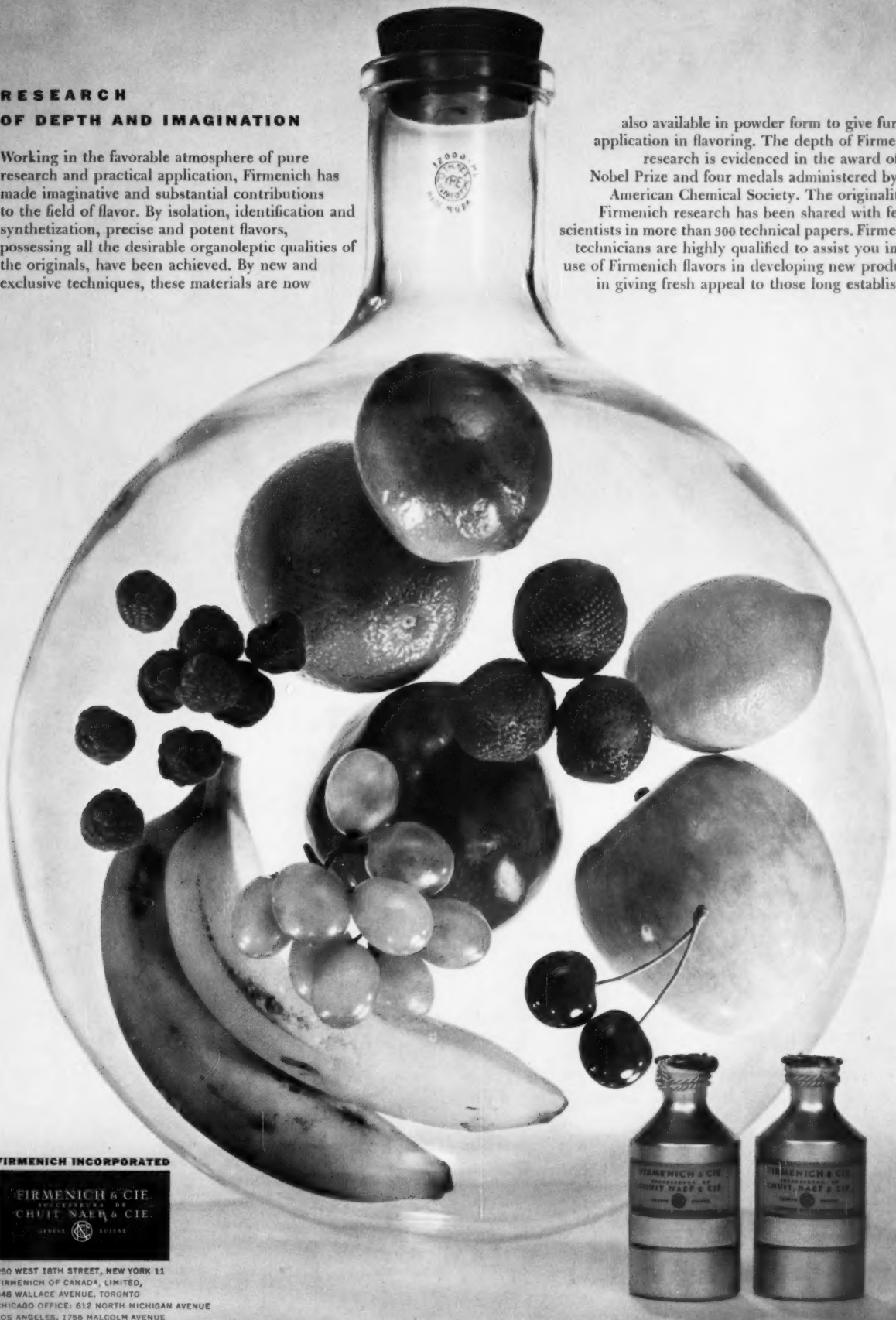
Working in the favorable atmosphere of pure research and practical application, Firmenich has made imaginative and substantial contributions to the field of flavor. By isolation, identification and synthetization, precise and potent flavors, possessing all the desirable organoleptic qualities of the originals, have been achieved. By new and exclusive techniques, these materials are now also available in powder form to give further application in flavoring. The depth of Firmenich research is evidenced in the award of the Nobel Prize and four medals administered by the American Chemical Society. The originality of Firmenich research has been shared with fellow scientists in more than 300 technical papers. Firmenich technicians are highly qualified to assist you in the use of Firmenich flavors in developing new products, in giving fresh appeal to those long established.



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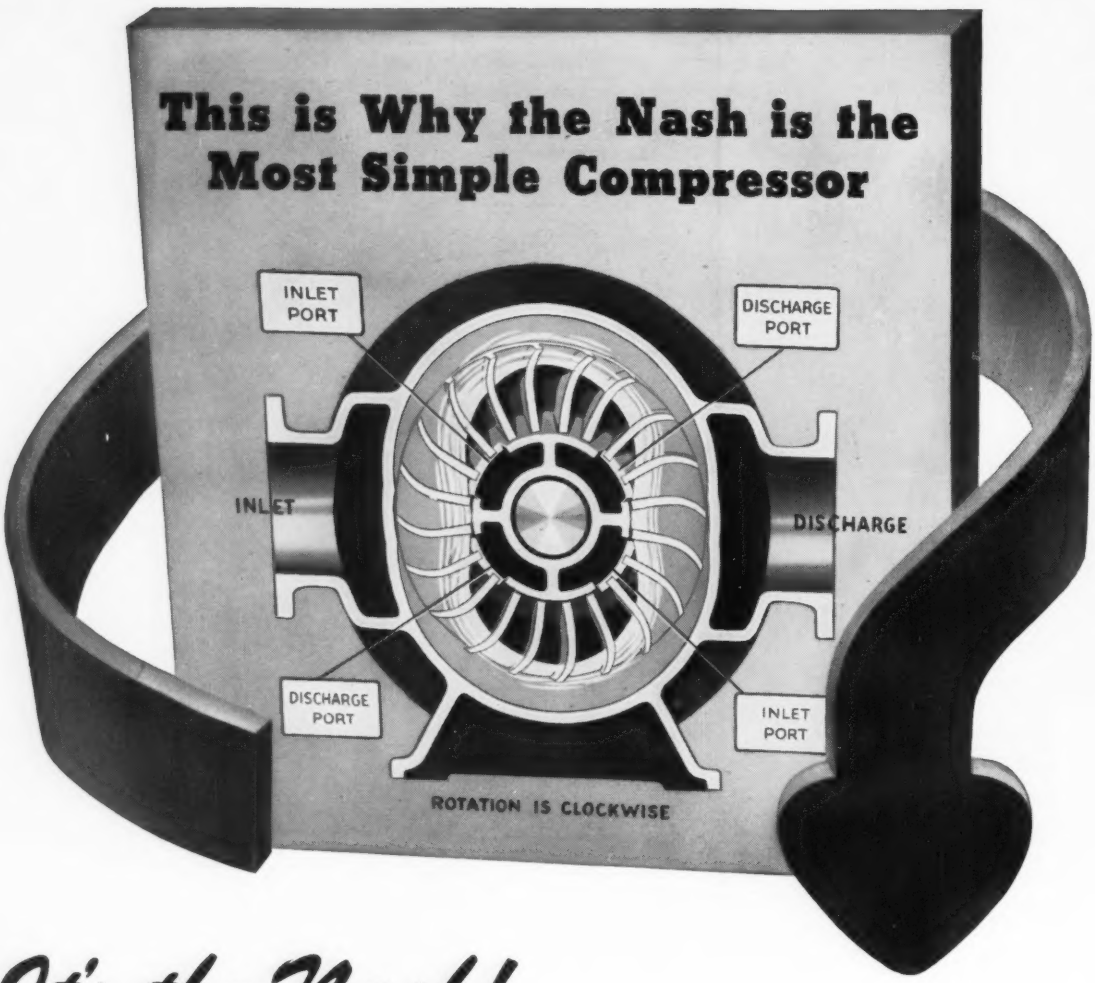
# This is Why the Nash is the Most Simple Compressor




# *It's the Nash!*

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods Data on these pumps sent immediately on request

**No internal wearing parts.**

**No valves, pistons, or vanes.**

**No internal lubrication.**

**Low maintenance cost.**

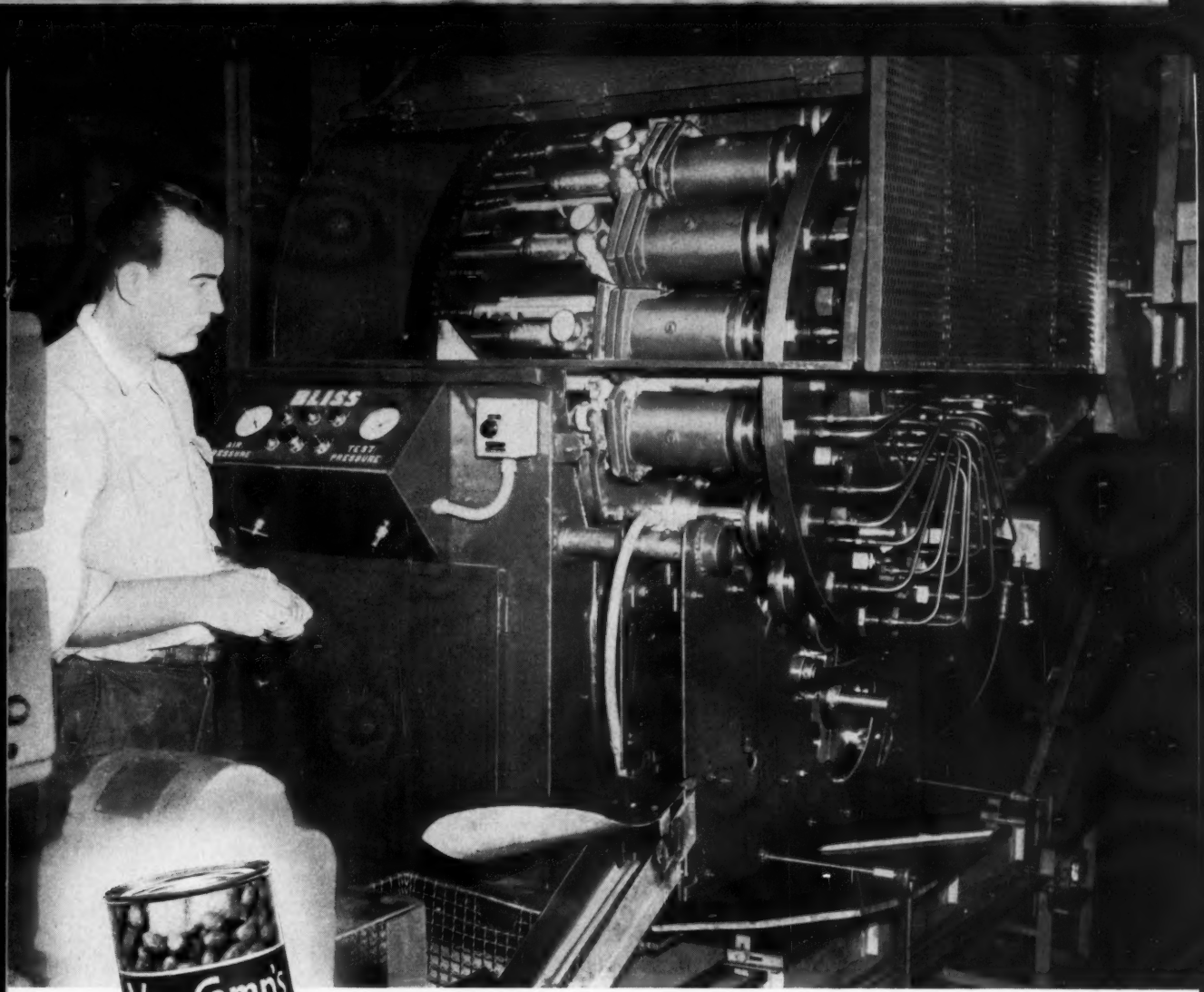
**Saves floor space.**

**Desired delivery temperature automatically maintained.**

**Slugs of liquid entering pump will do no harm.**

**75 pounds in a single stage.**

**NASH ENGINEERING COMPANY**
**313 WILSON, SO. NORWALK, CONN.**



# PORK and BEANS...

## *with a touch of* BLISS

This can tester detects invisible "leaks"... is typical of the variety of high-efficiency Bliss equipment that Stokely-Van Camp uses to make its own cans.

If *you* make your own cans... or are thinking of it, check with Bliss. Chances are that a completely Bliss-built and equipped "turn-key" plant can take the headaches out of the job for you. But whether it's a complete plant you need, a battery of machines or a single can tester, see your Bliss representative first.

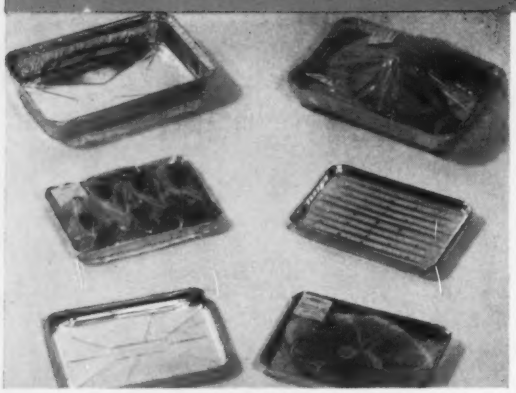
BLISS
SINCE 1857

**E. W. BLISS COMPANY · Canton, Ohio**

*BLISS is more than a name... it's a guarantee*

PRESSES • ROLLING MILLS • MILL ROLLS • DIE SETS • CAN MACHINERY • CONTRACT MFG.

# NEW PACKAGES & PRODUCTS



## Fresh Meat in Foil Trays

Now in the test-market stage is a new packaging concept—fresh meat packaged in rigid aluminum foil containers. The idea is a joint venture of Star Markets, Inc., and Ekco-Alcoa Containers, Inc. With the new package, the housewife can purchase and prepare the meat in the same container.

Three types of containers are being used in the test: A broiler unit, a fryer unit, and a roaster unit (in two pieces). Each style is made in a variety of sizes.

The market chain has developed a number of merchandising gimmicks to take advantage of the new idea—tie-in sales with vegetables, for example.

Circle 300 on Reader Service Card

## Giant-Sized Tea Bag

A jumbo-sized tea bag from Continental Coffee Co. is aimed at boosting quality of ice tea in restaurants. The 2-oz. bag increases extraction through the use of a more porous paper. Elimination of tape, string, or tag decreases the need for a stronger bag to support stress.

Size of the bag has also been changed to allow the wet tea to expand without the danger of bursting the bag.

The bag makes 1-gal of tea according to the National Restaurant Assn.'s recommended ratio.

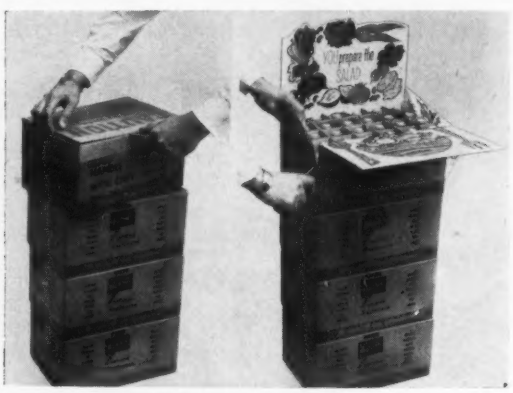
The tea bags are packed 50 and 100 in printed cardboard cartons.

## Orange Juice on a Stick

Concentrated citrus juice frozen on a stick is a new product that is gaining ground this summer. Produced and packaged by Pacific States Sales Co., Portland, Ore., the sticks are packed in handy take-home 6-packs.

"Market tests show that consumers prefer natural flavor over imitation fruit ices," says president Keith Anderson, "Our greatest selling point is that our frozen sticks contain natural Vitamin C."

The sticks are made from concentrated orange, lemon, and lime juice. Water, sugar, vegetable gum stabilizer, and artificial color are added to the concentrate.



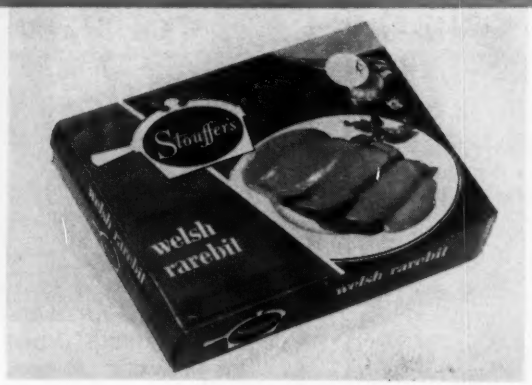
## Carton to Display—in 7 Sec.

With a flick of the wrist a novel shipping case for bottled salad dressing can be converted into a vivid 8-color point-of-sale display.

The "built-in billboard" is printed on the inner surfaces of the corrugated box, with more advertising data on the sidewalls and overlapping top flaps.

Called 7-Second Displacase, the box is converted with just three cuts and a few folds. To give the effect of a floor stand, the display is simply placed on a stack of unopened cases. Supplier is Stone Container Corp.

Circle 301 on Reader Service Card



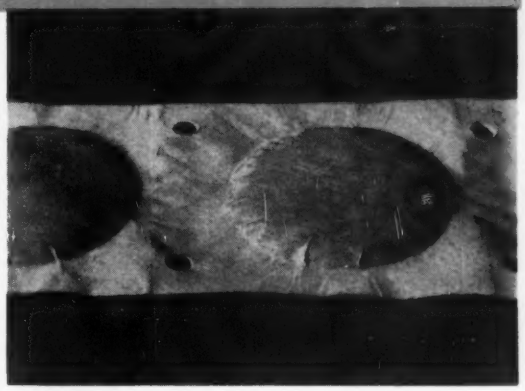

## Bright New Frozen Package

Following extensive test-marketing in Cleveland, Stouffer Corp.'s Frozen Cooked Foods Division has introduced a new line of packages. The company reports the new packages to be the result of an extensive packaging research program aimed at developing improved methods of illustrating products and creating appetite appeal for maximum point-of-sale impact.

Features are 4-color photographs of the prepared products. The Dutch oven trademark has been retained along with the coral background.

Carton is wax-coated and end-locked. The product is packed in a #706 Ekco-Alcoa aluminum container.

Circle 302 on Reader Service Card

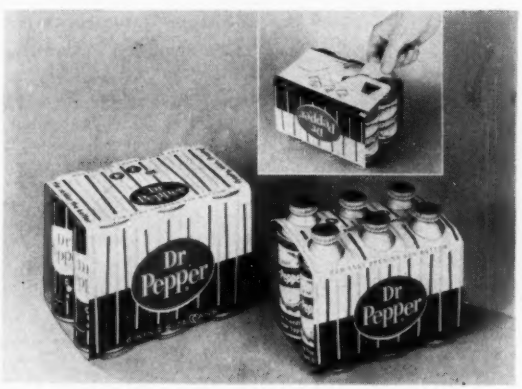


## Vender Brews 1 Cup at a Time

"Brew-a-cup", a newly developed vending machine which brews one cup of coffee at a time, uses single portion packets of coffee.

Consistent flavor and aroma is safeguarded with the airtight but water-penetrable packets. Each is roughly the size of two rounded and flattened tea bags. They are connected by a specially developed tape drawn from a sanitary canister into the brewing chamber.

In the chamber, percolator-hot water is forced through the individual packet, extracting and dispensing the coffee into the waiting cup. Process can be repeated every 9 sec. The machine can hold 500 packets at a time.




## Multi-Pack for Canned Pop

Efficiency and economy are the advantages cited by the Dr. Pepper Co as the results of their adoption of the Jak-Et-Pak multiple packaging. The multi-pack cartons are being used for a line of canned soft drinks—both 12-oz. flat and 7-oz. cone top cans.

Six-pack cartons for both types provide wraparound construction, yet are easily opened from the bottom through locking tabs. The packs stack readily.

Packaging is done with equipment supplied by Continental Can Co's Boxboard and Folding Carton Division.

Circle 303 on Reader Service Card

## 2 More for Sauce Line

Two new varieties have been added to H. J. Heinz Co.'s line of five sauces: Mustard and barbecue.

The mustard sauce is an importation and adaptation of a popular sauce produced by Heinz in Australia. The processor describes it as a "sweet-tart blend with a tangy flavor." It may be used as a flavoring ingredient in the preparation of salad dressings, dips, and vegetable dishes or for garnishing frankfurters, ham, or cold cuts.

The barbecue sauce introduction was scheduled to coincide with the time of the year when outdoor cooking is most popular. Packages are 8-oz. clear bottles.

# FLUIDICS

is a Pfaudler Permutit program providing
the know-how
the equipment
and the experience
for solving problems involving fluids

FLUIDICS covers such varied phases of fluid handling and control as:

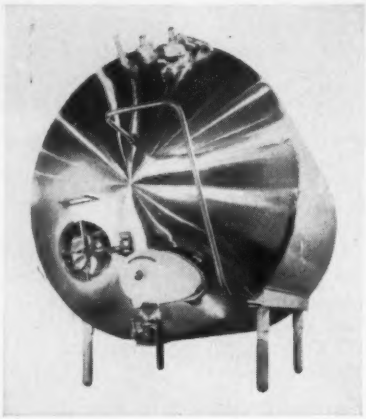
**blending • evaporation • distillation • drying • filling • heat exchange • storing • centrifuging • agitation • water treatment • waste treatment • corrosioneering • metering**

FLUIDICS AT WORK

## Equipment especially designed for dairy food processing

All of the important fluid processing of dairy products is covered by the FLUIDICS program . . . including the vital storage function.

In fact, more milk is stored in Pfaudler-built tanks than any other make.



**Bulk Milk Storage.** Sanitary construction. ASME approved wall cooler sections for ammonia, freon, or chilled water. Cylindrical or rectangular types of stainless steel. 600 to 8000 gal.

**Pressure Process Vat.** Effective heating or cooling of any fluid product, plus mixing and holding. Handles full or partial batches. Pressurized jacket reduces process time. 100 to 1000 gal. Also vacuum-pressure vats for removing unwanted tastes and odors during processing.

For further information on any of the products shown, write to our Pfaudler Division, Dept. FE-79, Rochester 3, N. Y.

**Mixer-Pasteurizer.** Thorough blending of additives including powders, frozen cream and butter. Proper agitation with no "lumping." Fast heat-up. Sanitary stainless steel construction. 150 to 1000 gal.

PFAUDLER PERMUTIT INC.

75 YEARS CREATING FOR TOMORROW Pfaudler

Specialists in FLUIDICS . . . the science of fluid processes


## New Packages and Products

**WATERPROOF MERCHANDISER** for asparagus offers an economical, attractive, and easily handled package. Supplier is Continental Can Co's Boxboard and Folding Carton Div.

Circle 304 on Reader Service Card

## New Product Shorts

**Caramel Puffs** are newest General Mills ready-to-eat cereal.

**Watermelon Ice Stick** is proving popular in Texas. Processor is Mell-O-Nice, Lulling, Texas.

**Specialty cracker line** will soon make debut under the Burry Biscuit label. Company will also expand its Euphrates Bread Wafer line.

**Ham Dinner** is the sixth variety to be added to Morton Frozen Foods line.

**All-Vegetable Bouillon** is now marketed by Vico Products Co., Chicago.

**Prize-Winning Beer** which first appeared at The 1893 Columbian Exposition in Chicago, is being reissued by Pabst. Called Pabst Original, the new beer will be distributed nationally.

**Hickory-Smoked Beef Roll** is a product of Hickory Farms, Toledo.

**Caraway Seeds and Salt** add flavor to Nabisco's newly marketed Salt-Tang snack sticks.

**Frozen Hush Puppies** are a new product of W. A. Davis Milling Co., High Point, N. C.

## Packaging Briefs

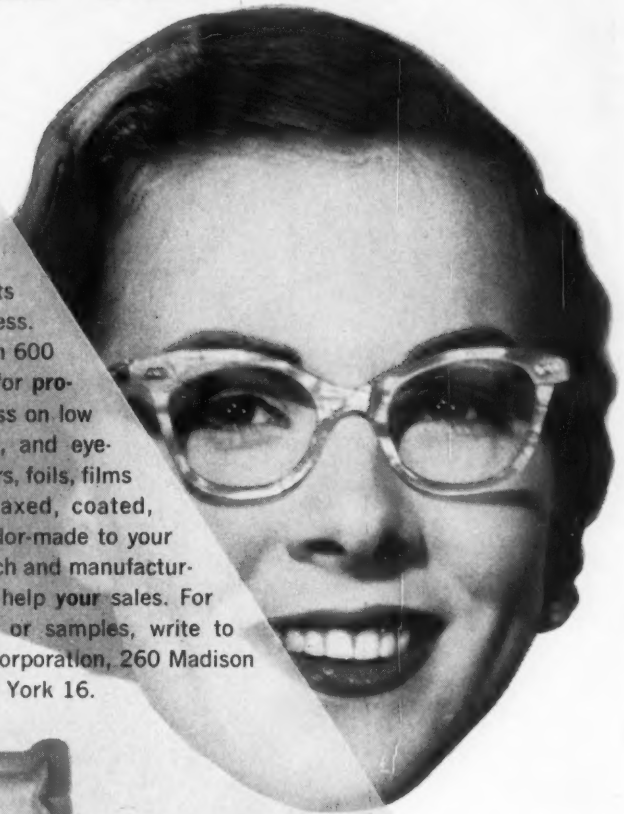
**4-Lb. Metal Cans** are the new container for Seapak Corp.'s cooked and frozen shrimp.

**Jumbo Instant Coffee** jar for Maxwell House now holds 10 oz. of product.

**Wrapperless** frozen food carton reported to stay tightly sealed at temperatures down to 50 deg. below 0, has been developed by Weyerhauser Timber Co.

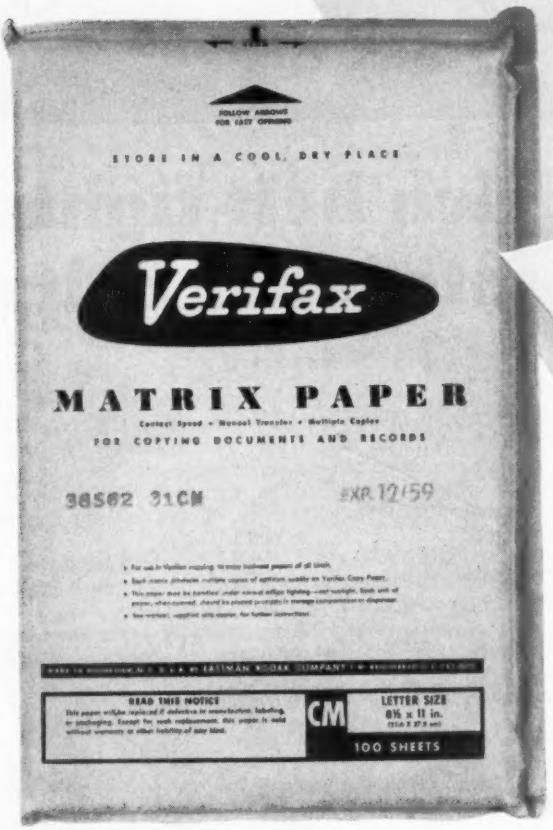
Circle 305 on Reader Service Card

# Just Between You and Your Customer



Faith in the quality of a product will bring your customers back again and again. In keeping that faith, your package must play a vital role.

Product protection that never lets the customer down is Riegel's business. We offer you a choice of more than 600 different materials... designed for **protection first**... with equal stress on low cost, high packaging speed, and eye-catching appearance. Papers, foils, films and combinations... waxed, coated, printed, or plain... tailor-made to your needs. Riegel research and manufacturing versatility can help your sales. For technical advice or samples, write to Riegel Paper Corporation, 260 Madison Avenue, New York 16.




**Riegel**

**PROTECTIVE PACKAGING MATERIALS**

Eastman Kodak's Verifax Matrix Paper for "quick office copying", is protected against light and moisture by a heat-seal laminate of foil and extra-strong kraft paper... made, gravure printed and poly coated by Riegel, using Eastman's Tenite polyethylene.



CIRCLE 25 ON READER SERVICE CARD 25

# New B.F.Goodrich belt fights moisture that rots other belts

*B.F.Goodrich "Green Pack" belt resists moisture, mold, fungi*

THAT B.F.Goodrich belt has three times the moisture resistance of other belts used in the food processing industry. At the plant shown above, this new belt carries wet, diced celery. Belts previously used here were a problem. Water soaked into the belt, weakened and rotted the fabric reinforcement. Moisture also encouraged the growth of mold and fungi.

To protect against moisture, B.F. Goodrich engineers developed a special treatment for conveyor belts called "Hydroseal". This treatment is applied to the fabric reinforcement, where it penetrates every cord, giving maximum resistance to moisture. Each of the fabric plies is also coated with rubber for additional protection.

This new B.F.Goodrich belt is more sanitary, too. It is the first to be made with a special rubber compound containing an inhibitor that resists most fungi and molds, keeps them from forming on the belt cover.

Food inspection is easier, more accurate because of the belt's light green color, a shade selected by color experts as being easiest on the eyes. The color is not just a surface coating. It is used throughout the belt, cannot fade or be rubbed off. Belt surface is extra smooth, so it won't trap dirt, is easy to clean.

Your B.F.Goodrich distributor has full information on the new B. F. Goodrich "Green Pack" belt and can tell you about its many other advantages for food-handling operations. *B.F.Goodrich Industrial Products Co., Dept. M-628, Akron 18, Ohio.*

**B.F.Goodrich *conveyor belts***

# Two-Way GMA Meeting Points Ways to Progress

If frank, two-way discussion of controversial problems represents progress—and we think it does—then the recent spring meeting of Grocery Manufacturers of America chalked up some important gains.

Touchy subjects like private labels and cooperative advertising contracts were analyzed by individual speakers and tossed back and forth by panels—with both manufacturers and distributors having their say.

Paul Willis, president of GMA, brought distributors into this "Town Hall Meeting" because of the growing realization that they and the manufacturers have many problems in common.

**Cooperative advertising needs change**

Take cooperative advertising, for example. A group of ten manufacturing and distributing executives concluded that the traditional type of contract is out of date—that the whole concept should be changed. Present practices result in "obituary notice" newspaper insertions instead of effective communications with the housewife. So the name "cooperative advertising" should be dropped for a more descriptive term. And contracts should have performance requirements clearly stated in simple language—and with enough flexibility to meet modern promotional needs.

It was agreed, too, that the term "allowances" should be restricted to reductions on invoices and be kept separate from promotional contracts.

Take another "hot" problem—manufacturer vs. distributor brands. Paul Willis put this on the meeting agenda because consumers in some stores have had difficulty finding their preferred manufacturer brands. And discussion was aimed at how "freedom of choice" for consumers can be preserved, and how both brands can best get along together.

A Super Valu Stores executive named these criteria for private labels: Significant saving to consumers for comparable quality, better return on shelf space and capital investment, and to meet competition. Significant advantages were credited to manufacturers' advertised brands. They include Pre-sold and accepted, better quality control, easier and cheaper to buy, turn over faster, and backed by merchandising service contracts, promotional assistance, and field men.

A National Assn. of Food Chains executive agreed that consumers should have freedom of choice. And a manufacturer conceded that the distributor practice of making every brand stand or fall on its own volume is acceptable—if display and promotion are equal.

It was emphasized, too, that careful cost allocation will help to prevent unrealistic differences in price between manufacturer and distributor brands—at both manufacturer and distributor levels.

**Sound trade practices save money**

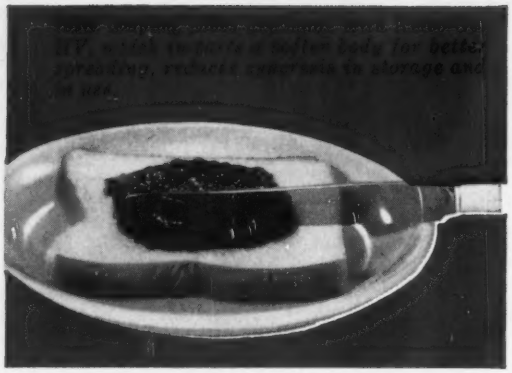
It was noted that cooperation to put sound trade practices into effect can save money. Improvements already have been made in shipping cases, price marking space, standardized coupons, more advanced notice for special promotions, reduction in waste of point-of-sale material, and prevention of out-of-stock problems through better sales and distribution systems.

All this adds up to two imperative needs for food manufacturers. One is an effective trade relations program, with a full-time manager in charge. Another is the development of a true picture of costs and profits of distributor vs. manufacturer brands. This alone could do much to keep the private brand problem under control. And fortunately, studies proposed and pilot tested by GMA may well produce this information.

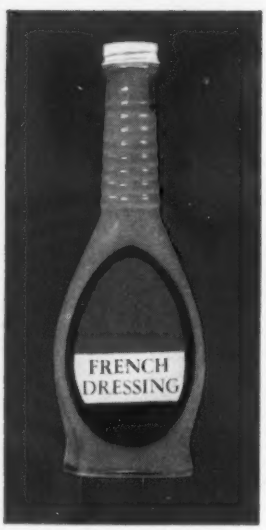
Meanwhile manufacturers are challenged by realistic marketing problems to make it better and cheaper, pre-sell it harder, and improve distribution.

A big order, yes. But either fill it or fail.

**In pressurized foods,** *algin colloids effectively stabilize aerosol-dispensed whipped toppings, syrups, flavors and sauces, and provide superior flavor release, controlled viscosity, and improved stability for longer shelf life.*



**In French and salad dressing, meat and barbecue sauces,** *Kelcoloid produces uniform and stable emulsions of superior flavor release, improved consistency, smoother texture and longer shelf life.*




# Products improved— new products created with these unique Kelco Algin Colloids

**Kelco-Gel HV®**
**Kelco-Gel LV®**
**Keltone®**
**Kelcoloid®**

PRODUCTS OF
**Kelco Company**

Less than a teaspoon of Kelco algin per pound of food product produces high volume whip, easier mixing, more tender texture, and retarded weeping (syneresis). Foods look better, taste better, stay fresh longer.

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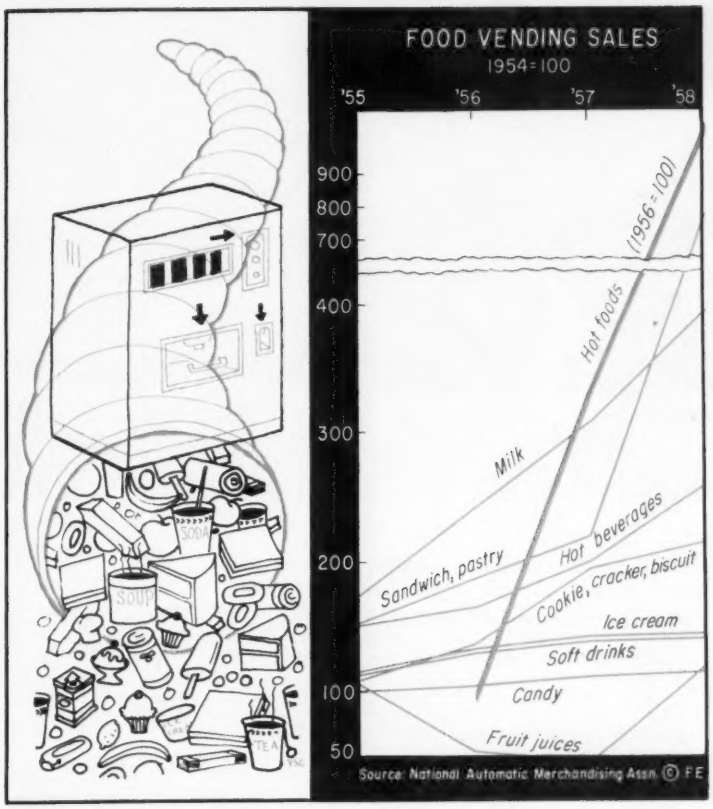
FOOD ENGINEERING
FOR MANAGEMENT IN MANUFACTURING PACKAGING, MARKETING

# Hot-Food Venders: Booming Market

**Looking for new outlets? "Pushbutton merchandisers" upped sales of ready-to-eats 178% last year . . . Here are tips on how this important segment of the vending field can help you, along with shrewd pointers on the special packaging that's needed**




**COOKED ITEMS:** Hottest sellers in the $2 billion automatic vending field.

AUTOMATIC VENDING machines have revolutionized mass feeding services and opened new outlets for ready-to-eat foods. Today, venders are selling people more than a million prepared food items a week in work locations, schools, institutions, travel centers, filling stations, and many other gathering sites heretofore not serviced.

Of all food items sold through venders, hot foods are making the most rapid increase percentagewise. Though starting from scratch only 5 yrs. ago, automatic merchandisers sold $18,507,000 worth of hot foods in '58, reports the National Automatic Merchandising Assn. This was a booming 178% increase over the year before.

The growth of the pushbutton, serve-yourself "cafeterias" has been spurred by such factors as the high cost of manual labor, scarcity of skilled labor for non-technical jobs, and tremendous expansion of facilities where people work and play.

## Faster Pace Helps

In many at-work locations, emphasis on speed results in shorter work hours, briefer lunch periods, and more efficient techniques in connection with food service. Schools use vending to supplement their food facilities, as mounting enrollments create new problems.

Many large service stations are expanding their vending facilities to include complete snack service, and the oil industry is investigating every aspect of providing more customer conveniences through such pushbutton service. Snack bars and drive-in establishments often supplement over-the-counter service with 24-hr. duty automatic units.

Vended foods are divided into four categories: Hot canned, freshly prepared requiring refrigeration, frozen, and packaged items requiring no thermal control.

Canned foods are presently offering manufacturers the best opportunity to increase vending sales.

The great majority of vended hot foods is sold in cans—primarily because handling problems for the operator are decidedly less than those attendant on serving freshly prepared foods. Where freshly prepared products in heated machines may show signs of deterioration in 8 hr. or less if they are not vacuum sealed, certain canned foods may be held at high heat for as long as three weeks.

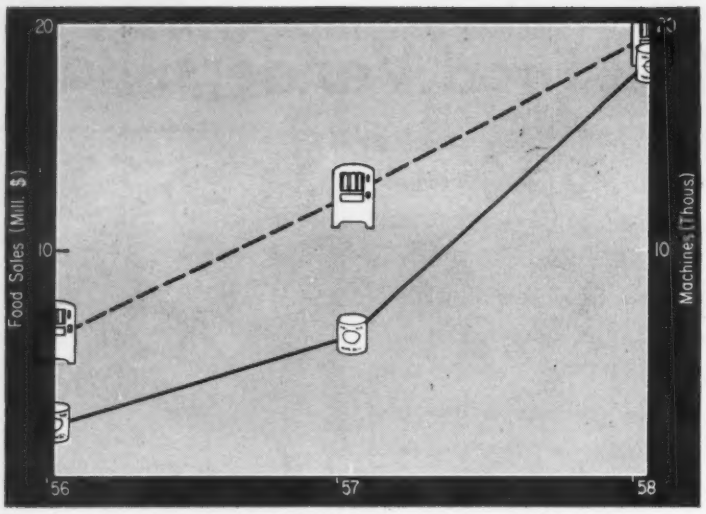
Canned foods also have a long shelf-life, thus minimizing storage problems.

Freshly prepared foods, sold in increasing volume through automatic units, still have problems because of on-the-spot preparation require-

**BIGGEST NEED** in food vending is development of tableware-like containers that have more appeal than conventional 8-oz. can.

**ARTHUR D. STEVENS**
Assistant Vice-President, Product Planning, The Vendo Co., Kansas City, Mo.

**AUTOMATIC CAFETERIAS** are spreading fast to work and play locations as newer hot-food dispensers widen range of meal service.




**PUBLIC** is gobbling up vended hot foods faster than machines can be installed. While number of mechanical units tripled from 6,000 in '56 to 19,000 in '58, dollar sales of prepareds skyrocketed ninefold from $2 million in '56 to $18 million in '58. Key factor is availability of robot sellers in wider range of locations.

ments. However, vending operators would welcome the role of middlemen if they were able to purchase a selection of refrigerated or frozen foods to sell through their machines in much the same way they sell ice cream novelties.

This is especially true of such products as cottage cheese and various salads, which cannot now be held in storage for extended periods of time. Mass producing, storing, and delivering of such items may well be worth exploring and developing for future sales.

Frozen foods, aside from ice cream, have not yet reached volume sales because there is no method of heating them quickly enough for successful vending. Although there is equipment on the market today for serving meals that have been frozen, this does not mean that food is brought from a frozen state to a piping hot temperature within the vending cycle, or from the time the coin is dropped until the product is delivered. Such food is either warmed gradually in the machines or is dispensed cold and warmed elsewhere.

A frozen meal that can be instantly heated is a goal everyone is shooting for. When it is achieved, probably via electronics, it will open up undreamed-of sales avenues.

Packaged food items needing neither heat nor refrigeration, such as candy, crackers, and pastries, form an established part of the vending volume. However, there is always room for new items and a ready market for those that will command mass sales by appealing to various tastes. As an example, the idea of combining crackers and cheese in packages for vending has quickly proved popular in many areas.

## Remember the Difference

Judging from what has been done to date, there is a popular conception that food venders represent an extension of supermarket or other such retail selling. Actually, this isn't true.

Far from being a substitute for grocery or supermarket sales, venders dispensing ready-to-eat foods represent an extension or replacement of restaurant or snack-bar sales. And there is a fundamental difference of both principle and emphasis between these two types of selling.

Failure to grasp this distinction has resulted in special packaging problems affecting the automatic merchandising of food. There is a noticeable lack of proper packaging, or of special packages designed exclusively for vended products.

The vending field has received both encouragement and support from food processors and packaging interests who have an important stake in increased vending sales. However, there has been relatively little cooperation in the area of pioneering and developing packaging and merchandising techniques for this new method of selling food.

Although lack of distinctive new containers is felt in every product area, hot canned foods are the most dramatic illustration. In the first place, the cans must be opened by a conventional can opener. There are no zip-off lids, no easy way of opening for the convenience of the customer.

In the second place, the tin can is not an appetizing container. The need is for "dishes" in which foods may be vended, rather than "containers."

**Eating should be a pleasant experience, and a conventional tin can does not convey an aura of satisfaction. If something more nearly resembled tableware were provided, sales in many locations would show a decided jump. It would be much more acceptable, for instance, to eat beef stew from a bowl than from an 8-oz. can.**

Lack of distinctive and sales-stimulating packaging isn't confied to hot canned foods. Almost without exception, vended food items, ranging from bottled beverages to candy bars are the same as products sold from grocery shelves.

Needed here are fresh, imaginative packages designed to increase the appeal of a vended food and to encourage repeat sales. Here, public demand has been ahead of product development.

While machine vending has tremendous potential for the market areas of the future, it is ready right now to increase food sales in places where volume feeding is conducted. But if this method of food selling is to grow, it will require specialized assistance in the important packaging field.

Recently food processors and packagers have become more active in making available new plastic, foil, and metal containers. While the cost of research, development, and production of new types of packages is admittedly high, the price of inactivity and obsolescence in the fast-moving food business is even higher. The business is ready and waiting for those who are interested in developing it.

## Brand Names Sell

On the credit side, food processors have made important strides in developing foods which can safely be stored at temperatures ranging from −10F (ice cream) to 150F (hot coffee) for long periods of time. Moreover, food companies, and particularly meat packers, have made a greater variety of canned, ready-to-serve foods in single-serving portions.

Insulated labels – cool to the hand–have been offered as a convenience for customers who purchase hot canned foods from machines. A limited amount of advertising has been used to promote the purchase of certain food products from vending machines.

Perhaps the greatest assistance given food vending by the food industry is that offered by brand name merchandise sold through automatic machines. Well known labels move products because people trust brands that represent quality satisfaction.

The millions of dollars spent in research, product improvement, and advertising by major food companies are reflected in volume sales of their products. A vending machine selling brand-name products has a tremendous advantage when it comes to acceptance by the public.

Information on how to produce and sell items for this retail merchandising method may be obtained from leading manufacturers, operators of vending equipment, or the National Automatic Merchandising Assn., Chicago.

The requirements are simple: Good food items with popular appeal which may be sold at reasonable prices. *–End*

## Self-serve meal dispensers catch on at—

**FACTORIES,** where need is for fast food service during short lunch periods and meal breaks.

**OFFICES,** where costs of manual labor and food preparation facilities have climbed to uneconomic levels.

**FILLING STATIONS,** too, where service-minded operators get additional revenue from waiting car-owners.

**HOME ECONOMISTS** prepare special party recipe in one of six new test kitchens of modernized Pillsbury home center.

**ELECTRONIC OVEN** helps center develop recipes especially styled for this new home cooking method.

# Spurs Product Development

**Pillsbury's expanded service center aids hunt for new items with streamlined scheduling, specialized units, home-geared facilities, and closer coordination with company market planners**

TIME WAS when the priority system was the best way to handle product work in consumer test kitchens. And this did assure emphasis on the most important developments.

Today, however, the great number of new products and myriad jobs needing to be done have strained the old procedures.

It was this situation that recently brought Pillsbury to spend $80,000 on an expanded home service center—made up of no less than six specialized kitchens. This center now plays a keen role in product development, recipe testing, quality control, packaging, and marketing. It further keeps developments in step with long-range trends in home kitchen facilities.

Specifically, the department's output was quadrupled by addition of 2,700 sq. ft. of space, plus installation of a complete line of cooking appliances, including an electronic oven and backyard-type barbecue grill equipment.

The staff is now better utilized for speedier scheduling of product work, with accent on new item ideas and developments.

With expansion has come specialization. An individual kitchen is assigned to serve each of these groups of products: (1) Flours, (2) refrigerated foods, (3) cake and frosting mixes, (4) variety mixes, and (5) new products not yet on the market. The sixth kitchen provides photography service for the other five.

Each product section operates as an independent department under the direction of a group head who reports to Ruth Andre, director of the home service center. Depending upon the number of products handled, a section's staff of home economists (including group head) varies from three to six. The home center is under the wing of the director of marketing, who reports to the vice-president of the grocery products division.

Easing the work of the professional home economists is a non-technical consumer correspondence group—supervisor plus a staff of six. This group now handles about 60% of the correspondence formerly answered by the staff of home economists.

## Home Service at Work

Pillsbury's home service group is the company's direct contact with the consumer. It plays an active part in proposing and developing new products and packages.

Let's see how the home service

## Facilities Keyed to In-Home Trends

**BARBECUE GRILL** is used for recipes that are in keeping with popular trend toward outdoor cooking.

**BUILT-IN WALL** refrigerator provides ready accessibility of a variety of products.

# With Updated Kitchens

center—particularly its product development kitchen—helps to get fledgling items started.

New product ideas, which may originate anywhere in the company, are evaluated by a panel of representatives from these departments: Development, marketing, consumer research, agency, and home service. Accepted ideas are then assigned, for formulation, to the research and development laboratory.

Home service comes into the picture by studying recipes and baking a "home recipe prototype." Also in the act, at this stage, are marketing and consumer research departments, which work on product standards.

Once lab technicians have made up a batch to match the prototype, samples are submitted to home service for preparation under identical consumer-home conditions. Aim here is to determine if the product is ready for consumer testing. If not, home service recommends revisions.

Accepted samples are then prepared in pilot-scale batches for market testing. If these tests prove the product to be acceptable, it then goes into production as a new item.

Home service's duties don't stop here. It works on the new product packaging by: (1) Providing recipe directions; (2) checking label for acceptability of layout, format, and readability; and (3) assisting advertising agencies in color-photographing products for package art work.

After the product moves into national distribution, all further work becomes the responsibility of one of the department's four product groups that handle existing items.

Such work—a cooperative function with advertising and promotional departments—is geared to:

1. Create advertising ideas through new recipes that extend product usage.

2. Change labels when called for by new recipes or pictorial presentations.

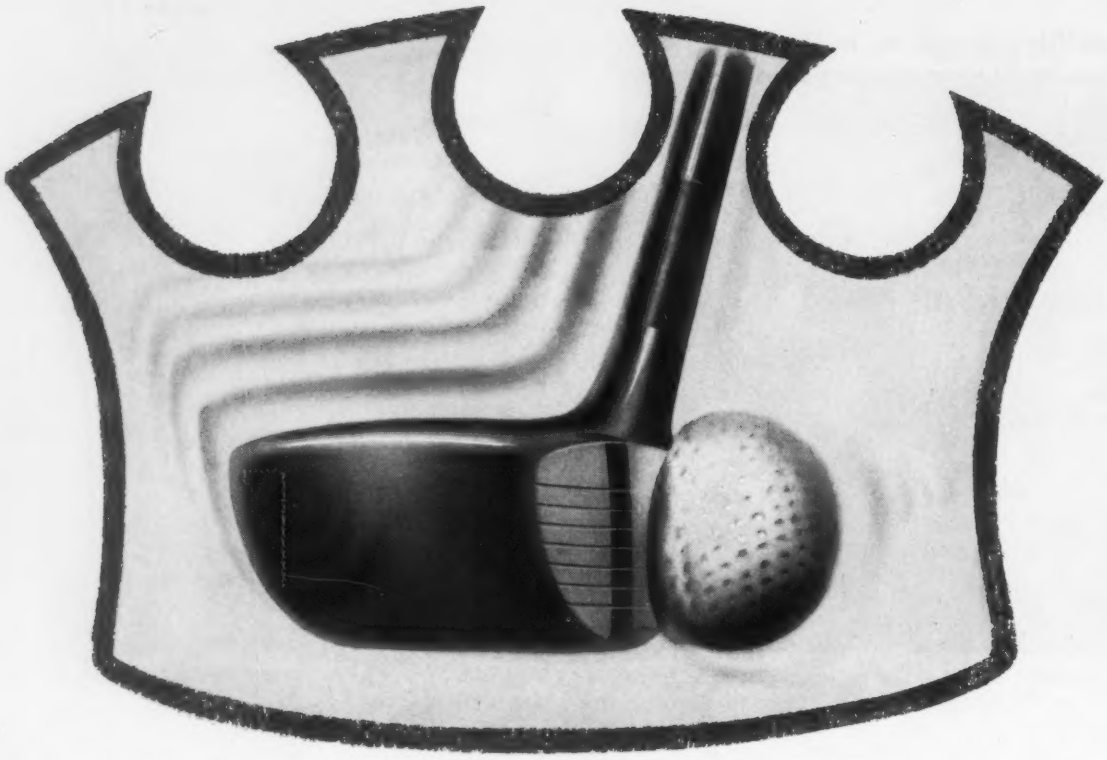
3. Furnish material for promoting products through use of recipes for cook books, package inserts, store tear-offs, and tie-ins with other company products.

Publicity is another responsibility of home service. Recipes, for example, are worked out for newspaper or magazine use, and product releases are prepared.

Ads and commercials are cleared through home service before they are run through any media. This serves to check for accuracy of content and believability from a consumer standpoint.

Facilities of the kitchens are essentially the same, except for those incorporating the electronic oven and barbecue grill equipment. Included are gas and electric ranges (double oven), wall ovens (gas and electric), floor- and wall-type refrigerators, freezers (upright, chest, and under-the-counter), popular electric mixers, and a wide variety of bake pans, china, glassware, and silverware.

Installation of the electronic oven is in the line of long-range planning to develop electronic cooking methods against the day when such units will be common in the home. The barbecue grill is in line with the current popularity of outdoor cooking. —*FE Staff*



*In golf balls . . . and lug cap seals*

## Live rubber can take it

You can count on live rubber to stand up under tremendous compression—in a well-hit golf ball or on a tightly sealed jar.

Only Crown lug caps give you the benefits of a live rubber ring: longer shelf life, better sealing despite minor glass flaws. For positive sealing, your best choice is Crown. Your inquiries will be answered promptly.

**CROWN**

*for cans · crowns · closures · machinery*

**CROWN CORK & SEAL COMPANY INC., 9300 Ashton Road, Philadelphia 36, Penna.**

# CASE HISTORY OF MONTH

From files of *National Consumer Panel Division of Market Research Corp. of America.* . . . Material is factually correct. Identities of products and companies have been masked to insure anonymity.—The Editors

## How to Sell More Packages Per Sale

**Management's problem**

SALES OF OUR TYPE OF PRODUCT are growing, mainly because consumers are buying larger quantities per transaction. To take full advantage of this trend, we want to find the most efficient manner in which to raise the average size of purchase of our brand. Are we likely to get better results from multiple pricing or from multiple packaging?

### WHAT WOULD YOU DO?

**Management's decision**

We ordered a study of consumer purchases during the peak sales periods of the two preceding years. This probe, made by the National Consumer Panel, measured: 1. Percent of total volume moved in 12-oz. packages as compared with 6-oz. containers. 2. Percent of total volume purchased at various multi-unit levels.

**Result of action**

It became apparent that the market's overall gain stemmed from a substantial increase in 6-oz. volume. In fact, movement of the 12-oz. size had declined slightly. This meant that consumers were not shifting to a larger package, even though they were buying more of the product at a time.

However, there was a sizable increase in the number of 6-, 10-, and 12-package purchases.

To investigate further the possibility of multiple packaging, researchers checked the size of purchases in the major chain stores. One chain was selling its private label in a 6-pack. Although this chain's sales were preponderantly at the 6-package level, its total volume had increased at a lower rate than the market as a whole. Moreover, the average transaction size in the chain's stores was below the level for the entire market.

Thus, it appeared that a 6-pack operation might possibly inhibit the purchase of even larger quantities.

Attention was then turned to other methods of increasing the average transaction size. We finally decided upon a 3-package coupon promotion, timed to break early in the peak-selling season.

While this was admittedly not the optimum size for the high-volume sales months, we felt that it might produce a very early sales spurt and persuade retailers to give our brand extra support in succeeding months.

Subsequent MRCA data indicated that we accomplished our purpose. Our brand's average transaction size rose some 16%, compared to a total market increase of about 10%.

For more information, write to Case-History Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y. Your inquiry will be directed to the source of the case-history item.


ULTRASONIC BREAKTHROUGH!

ONLY ACOUSTICA ULTRASONIC CLEANERS HAVE MULTIPOWER!

**The Multipower transducer** developed by Acoustica research, multiplies the power and efficiency of ultrasonic action. Cleaning is faster, better, labor costs are lower. Acoustica ultrasonic cleaners are built for performance and durability. They are engineered to the finest standards, unequaled in quality and value.

Off-the-shelf in capacities from 1 to 75 gal. or custom built to 5000 gal. and more. Expert Acoustica engineers can help you with your cleaning problems. Send for further information.

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Send information describing advantages of Acoustica ultrasonic cleaners.

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Company_____

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CIRCLE 35 ON READER SERVICE CARD 

# Simplicity in steam traps can effect big savings in parts inventory and maintenance time

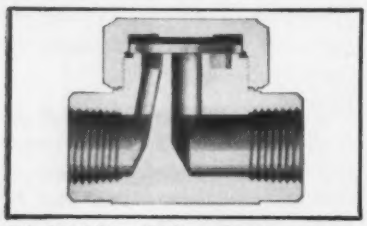
*by John W. Ritter, Test Engineer*
*SARCO Company, Inc.*

The function of all steam traps is to release condensate and prevent steam loss. However, the method of trapping can make a great difference in cost and effectiveness.

In the Sarco Thermo-Dynamic Steam Trap, the method is fundamental. Air or condensate entering the trap must flow from the inlet tube, radially across the underside of the disc valve, to the outlet. The space between the inlet tube and the disc forms a nozzle in which the static pressure energy of the incoming fluid is partly changed to velocity across the underside of the disc, with a resultant *decrease* in pressure. (This will be recognized, of course, as the Bernoulli Principle.) Use of this fundamental method means reliability in operation.

As the high velocity fluid jet strikes the side of the upper chamber, some recompression takes place, so that the pressure above the disc becomes greater than the pressure below it. The pressure reduction under the disc and the pressure recovery above it depend on the internal energy of the fluid. As the condensate above nearly approaches steam temperature, its internal energy is enough to overcome the upward force at the inlet tube and the disc snaps down in the inlet tube, which is the inlet valve seat.

Simultaneously, the disc also seals the outer ring, which isolates the space above the disc from the outlet. The disc valve is therefore held firmly against the inlet valve seat until the pressure in the control chamber is reduced by condensation. The upward force then exceeds the downward force and the disc valve opens.



This 3-part Sarco TD Steam Trap has only one moving part—the hardened, polished stainless steel disc.

No other trap uses the velocity of the fluid to operate the valve or uses the recompression of the flowing fluid to trap the valve closed and to hold it closed. When it closes, it closes tightly – no "operating steam" leaks out.

## 40 seconds inspection time— that's all it takes for a SARCO TD Steam Trap

Just back off the cap of a Sarco TD. Lift out its single moving part, the stainless steel disc. Wipe it off, and drop it back. No adjustment is ever required, at any load or any pressure in its range – from 10 through 600 psi.

The TD operates in any position, won't blow steam at any load. Small as a tee fitting, it can be installed in tight places. Its versatility and reliability cut cost of big replacement inventory.

Write for "Literature Kit 2A" today and get latest bulletins on the TD Steam Trap and other Sarco steam traps. Remember that Sarco can give you impartial advice on *Production Planned steam trapping* because . . .

5605-B

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**COMPANY, INC.**
635 Madison Ave., New York 22, N. Y.

*Only Sarco makes all 5 types:*
*Thermostatic • Liquid Expansion • Float Thermostatic*
*Thermo-Dynamic • Bucket*

STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES


CIRCLE 36 ON READER SERVICE CARD

CIRCLE 37 ON READER SERVICE CARD→

# You name it...

# STANGE

## will season it better!

. . . because with Stange, seasoning is both a science and an art: Science —in processing the basic seasonings: Art—in the application of these seasonings to your products to achieve distinction in their field for flavor and eye-appeal.

**STANGE**

**TALENT TO CREATE**

**SKILL TO PRODUCE**

**FLEXIBILITY TO FIT YOUR NEEDS**

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**CREAM OF SPICE SOLUBLE SEASONING • GROUND SPICE**
**PEACOCK BRAND CERTIFIED FOOD COLOR**

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# MARKETING SIGNALS

## Why Not "Marketing Expenditures"?

Capital spending is much in the news these days, it being one proof of a company's vigor and forward-mindedness. But, with the total marketing concept being widely accepted, it may be appropriate to give marketing expenditures prominent billing in annual reports.

The steel industry exec who said "I'd rather own a market than a mill" knew whereof he spoke. When you tot up the costs of new product development, market testing, consumer research, advertising, selling, and all the other factors that go into building a franchise, you have a sizable outlay. Throw in physical distribution, plus the hidden charges of wheeling and dealing, and you can see what's required to develop—and hold—a market.

Important as these items are, food firms still group them under the pablum-like phase "general, selling, and administrative expenses." Some of the far-seeing execs, though, are beginning to feel that a more honest breakdown of marketing expenses would be a start at finding out the industry's true marketing costs. Given this foundation, efforts to reduce those costs would rest upon firmer bedrock than today's quicksand guesses.

## Better Sales Coverage Targeted

As supermarkets allocate larger space to non-foods, manufacturers with diversified lines have to coordinate selling strategies to get more products into more stores with the greatest possible economy. That's the reasoning behind Armour's new grocery products division, which has the same salesman pushing canned meats, soaps, dog food, and detergents.

Besides eliminating duplication, the new approach means more frequent coverage of key retail accounts and, once warehouse inventories have been realigned, more large-volume orders by dealers. Other benefits: Greater impact per ad dollar as the result of consolidated ad budgets, and sharper market development from new brand manager setup.

## TV Spending Up

Food and beverage makers, who plunk about 25% of their ad dollars on television, will probably give that medium an even bigger chunk this year. Data released by Television Bureau of Advertising for the '59 first quarter show spot TV expenditures for food, sweets, soft drinks, and beverages up 32% (to $65.7 million). Network outlay climbed 10% (to $35.7 million).

## 'Migration' Trend Grows

U.S. firms are tapping low-wage areas south of the border in an effort to prevent rising labor costs from pricing them out of export markets. Latest outfit to join this trend is Minute Maid, which last month bought into a new Mexican company that exports juice concentrates to Canada and Europe.

Says Robert M. Blake, president of firm's international subsidiary: Move will keep MM's products competitive pricewise in foreign markets, also give company a hedge against possible overproduction in Florida. Another factor, probably, is the sharp expansion in other citrus areas (Israel, Italy, Spain, North Africa) that's cut into overseas volume of American products.

## Takes Guesswork Out of Store Orders

To help retailers achieve their prime objective of maximum profit per lineal foot of store space, Stouffers' salesmen are now armed with a new market research study that shows how in-store profits of the company's items stack up with frozens in general. The guide also sets up a priority system among the firm's 21 prepareds, indicating which items are best suited for outlets located in either high or low income areas.

## Improves Feed-Back From Field

Keeping on top of developments in the field is necessary for effective, fast-moving strategy. Dr. Pepper does this with a rotating marketing advisory board that's made up of five franchised bottlers.

The group counsels company management on various marketing ideas and programs during the planning stages. And, because they're selected from different areas, the advisors give management a wider marketing perspective—a factor bound to become more important as Dr. Pepper expands sales beyond its traditional Southern base.

## BRIEFS

**Lower selling costs** can't be cited by manufacturers as a justification for discriminatory services and/or allowances, U. S. Supreme Court ruled. Also: Absence of competitive injury is no defense, either.

**Food processing by supermarkets** is tabulated in latest Super Market Institute annual review. About 24% cook prepared delicatessens, 15% ripen bananas, 13% candle and grade eggs, 12% operate central bakery, 6% smoke or cure meat, 5% make ice cream, 4% roast coffee, and 2% prepare frozen foods.

**Cooperative merchandising getting new twists.** Grower groups have begun joint ad drives for related items. And outdoor billboards are being "partnered" for the first time (Cain's potato chips, Underwood hams).

**Luau party kits** will spark Chun King's big summertime campaign, linking firm's American-Oriental line with cook-out foods. It's estimated that 60% of America's families now own outdoor cooking equipment.

**Get the women to buy beer**—that's the advice often given brewers. Jacob Ruppert is out to do just that with a fashion-beer tie-in that includes fashion shows, special retail outlet window displays, and department store promotions.

**LOOK** *for improvements in insect control*

# NEW! FASTER MOBILE FOGGING

A new design in insecticide sprayers! It's the WEST SPACEMASTER. With newly patented "aerosol" nozzles. Five of them. It dry fogs three times faster than conventional two-nozzle sprayers. Saves time and labor. Ideal for large or small areas where compressed air is unavailable for fogging.

In one minute, the SPACEMASTER fogs 5,000 cu. ft. for flying insects*. Or 5,000 cu. ft. in two minutes for crawling insects. From one position it fogs 40,000 to 50,000 cu. ft. Its capacity without refilling is up to 384,000 cu. ft.

The SPACEMASTER is controlled by time clock. It is compact. Light metal construction. With a simplified compressor system. Easy to move up and down stairs. Easy to maintain. Approved by Underwriter's Laboratories.

The SPACEMASTER and "aerosol" nozzles are unmatched anywhere. They are exclusive West products. We'd like to demonstrate their faster fogging advantages. No obligation. Just call your nearby West office. Or send the coupon to our Long Island headquarters, Dept. 60.

☐ Send full information of the new SPACEMASTER.
☐ Have a representative arrange a demonstration.

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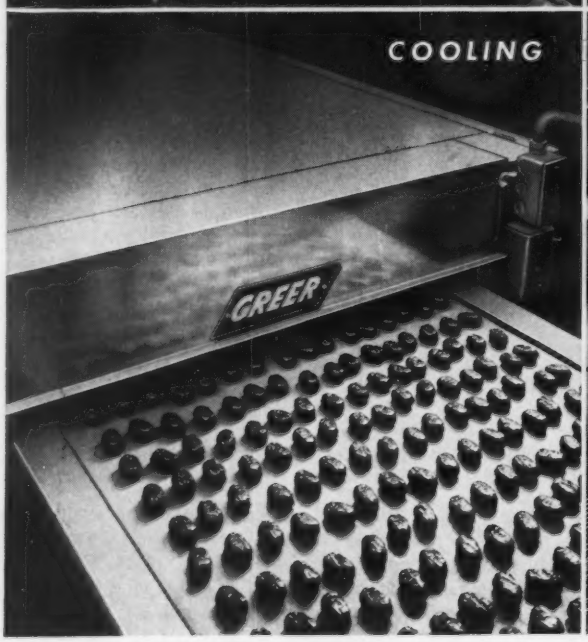
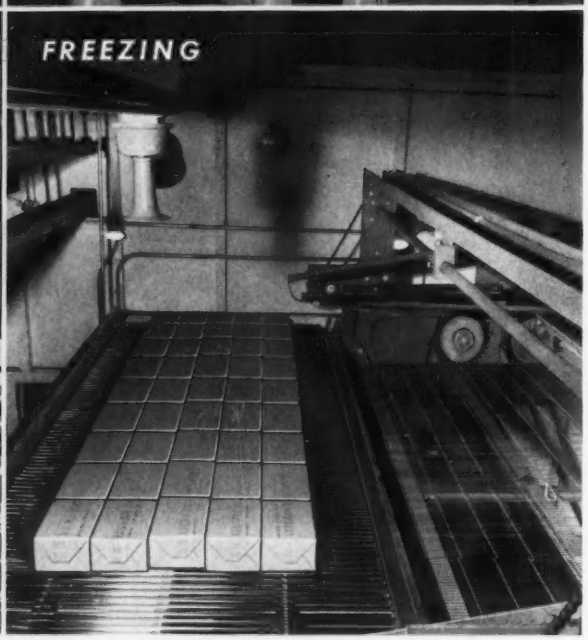
CIRCLE 39 ON READER SERVICE CARD 39

# GREER IDEAS PRODUCE A BETTER WAY...




*Authorities agree — continued success in food processing depends on the introduction of new products. Why not draw on Greer's 42 years of experience in continuous production techniques? Put Greer ideas to work, producing a better way to new products for you. For complete information on Greer's revolutionary new all-inclusive development-through-production service —*

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BRINGING BETTER FOOD TO MORE PEOPLE AT

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## Now Greer offers all-inclusive program in Development, Pilot Testing, Production Planning, and Equipment Design, Manufacture and Installation.

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Whether your new product involves meat, vegetables, candy, ice cream, or baked goods . . . whether it requires Mixing, Forming, Coating, or Dusting . . . Baking, Broiling, Roasting, or Frying . . . Cooling, Freezing, or what have you — we will engineer it into production for you!

### HERE ARE SOME OF THE QUESTIONS THIS NEW GREER SERVICE ANSWERS

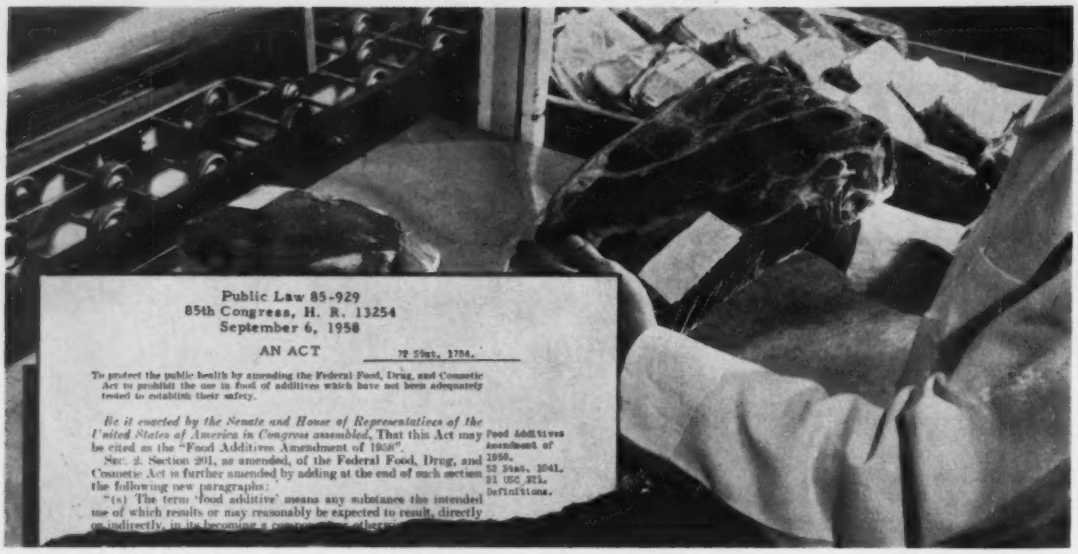
- What chemical and physical factors will change in expanding from test kitchen to full production quantities?
- Must formula be changed for full-scale production?
- Can more economical ingredients be used without adverse effect?
- What factors effect taste, color, texture, shelf life?
- What effects do various metals have on product?
- What is ideal order of processes?
- How must product be protected during production?
- Must atmospheric environment be governed, and how?
- How can your present plant best accommodate a new production line?
- How can present lines be altered for new product?

**GREER**

LOWER COST



CIRCLE 41 ON READER SERVICE CARD 


Public Law 85-929
85th Congress, H. R. 13254
September 6, 1958
AN ACT
72 Stat. 1784.
To protect the public health by amending the Federal Food, Drug, and Cosmetic Act to prohibit the use in food of additives which have not been adequately tested to establish their safety.
Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Food Additives Amendment of 1958".
Sec. 2. Section 201, as amended, of the Federal Food, Drug, and Cosmetic Act is further amended by adding at the end of such section the following new paragraphs:
"(s) The term 'food additive' means any substance the intended
Food Additives Amendment of 1958.
52 Stat. 1041.
21 USC 321.
Definitions.

**AMENDMENT** to Food, Drug and Cosmetic Act puts compulsory safety requirements on untested packaging substances, may cloud future applications of the newer materials that have caught on recently or which are still in the development stage. Upshot is new formal procedure for getting FDA approval.

# How New Additive Law

## Sweeping changes bring wider range of materials under regulation, require proof of safety before actual use, and pose prospect of long, costly tests on newer plastics

THERE'S TREMENDOUS significance for your packaging in the new food additive law—since it requires that no material in direct contact with food in interstate commerce contribute any hazard to human consumption.

This represents an extension from the previous situation, in which it was packaging materials for "meat and meat food products" that required such prior approval.

Since March 5, the Government has required prior proof that ingredients transferring from a packaging material are safe for use in a given food. Data substantiating the suitability of the material for packaging are required. As a result, plastic packaging materials, unless specifically exempted, should not reach the market without first undergoing tests for extractability and/or toxicity.

**The new amendment to the Food, Drug & Cosmetic Law places the burden of proof on the packaging material manufacturer and fabricator. Unfortunately for the manufacturer and fabricator, the amendment is more specific to food additives than it is to food packaging materials. Nevertheless, the manufacturer must submit a complete description of the packaging material for FDA judgment before any use of the plastic can be made, unless already exempted** **(see panel on p. 44).**

If the packaging material is further altered in composition by the fabricator, he must submit supplementary information describing the changes or additions made. This new amendment subjects many more plastic materials to FDA review than previously. However, it will reinforce what has become standard voluntary procedure on the part of most plastics manufacturers.

Because federal approval involves careful scrutiny of the detailed composition of plastics formulations, the plastic materials manufacturer normally assumes responsibility for obtaining approval for specific compounds sold to his customers. In doing this, he applies to the appropriate federal agencies regarding the use envisioned for the food package.

Composition changes made by the fabricator must also be established as safe by the pertinent agency review. This, of course, is his responsibility rather than that of the plastic materials manufacturer.

To provide for the inevitable adjustments in formulation and, where possible, to avoid lengthy and costly animal-feeding studies, the manufacturer normally contacts the agency as early as possible in the course of product development. A product may be—

1. A polymer sold as such with subsequent additions of diluents, solvents, plasticizers, lubricants, colorants, and other additives;

2. A polymer compound already prepared for subsequent molding or extrusion into rigid or semi-rigid containers;

**G. W. INGLE and R. A. McCARTHY**

Respectively, Research Section Leader and Technical Service Representative, Styrene Polymer Products, Monsanto Chemical Co.

**STIPULATION** that non-toxicity of packaging materials be proven before actual use will require long (up to 4 yr.) and costly (as much as $50,000 per ingredient) testing procedures such as battery feeding shown here.

# Affects Your Packages

3. A polymer latex for coating paper containers;

4. A polymer film used as such.

Unless individual colorants are specific to the formulation of the basic material, a "natural" (uncolored) grade is submitted for approval. Even though colorants must be thermally stable to withstand processing conditions, and finely dispersed in the plastic material, they cannot be assumed to be inert from a toxicological viewpoint.

Extraction tests are required to prove that no colorant will leach into the food. The infinite variety of organic and inorganic colorants and all their combinations taxes the availability of laboratory facilities to prepare the data required for federal approval.

A procedure for determining the extractability of colorants, which utilizes the spectrophotometric technique, was reported by Dr. Lehman (in the *Quarterly Bulletin*, Association of Food & Drug Officials of the U.S., 113-114, Apr. '57), but demonstration of its utility is needed. It is possible that this method will prove sound and allow the clearance of the majority of useful colorants.

### Where Check It?

**Packaging people seeking approval for use of a new material should first determine whether the intended use (1) falls solely in specialized meat or poultry spheres, or (2) is of a more general packaging nature.**

**If the former, then the check should be made with USDA's Meat or Poultry Divisions. If the latter, FDA should be contacted.**

**Some materials, of course, may not even need to be checked—in light of the fact that the new amendment exempts: (1) Substances generally recognized by qualified experts as safe under conditions of intended use, (2) substances previously approved by FDA or Meat or Poultry Divisions, and (3) certain pesticides.**

### Absolutes Don't Help

It is hoped that extractability tolerance levels will be developed for specific colorants (or classes) to provide greater flexibility in formulating colored plastics for food packaging. While the present Congress may pass new, clarifying legislation, colorants are now classified simply as either "harmful" or "harmless" with no quantitative graduation now available between these two extremes.

For this reason all FDA colorant tolerances now are essentially zero. In one case, for example, the limit of migration specified was ten parts of color material per billion parts of food.

Normally, prompt approval is given to applications for plastic materials containing ingredients which are the same, or are similar to, previously tested materials in constitution, combination, and concentration. When new combinations of previously approved material are involved, or specific problems are evident (such as gross changes of concentration and mutual interaction), extractability data are more likely to be required.

Plastic materials with previously unevaluated or toxicologically questionable ingredients naturally require more thorough investigation. Contacts are best made with FDA to discuss proposed methods of testing with maximum reliability to insure effective effort prior to the analytical work itself.

A specific ingredient must be assumed to be toxic until it is proved acceptable or non-toxic, if safety in foods and food packaging is to be adequately maintained. For best rapport, application to the FDA should contain detailed data on the function, chemical identity, and concentration of each ingredient, in addition to descriptions of extractability and analytical procedures used (including a reference to their precision and accuracy).

Relevant facets of manufacturing methods, especially composition controls, should be described, in addition to the proposed usage. This information will be required in the *formal* petitions made to FDA under the regulations as they are established.

Toxicity characteristics are determined via short-term and in most cases long-term (chronic) animal feeding studies. These and extractability procedures should be agreed upon in advance to insure joint understanding by FDA and the manufacturers on the methods to be used.

Often, standard or traditional analytical methods for detecting presence of migrated ingredients are not acceptable, since precision of one part per billion may be required. Here, radioactive tracer techniques may be required.

Depending on the combination of feeding and/or extractability studies undertaken, the analysis can be costly (up to $50,000 per ingredient), lengthy (up to 4 yr.), and complicated (requiring precise synthesis of compounds with radioactive

## Materials Already OK'd for Packaging

Here are materials of which certain specific formulations have been approved for food packaging.

Can Enamels—natural East Indian and Congo resins, substituted phenol formaldehyde, bisphenol-formaldehyde, urea formaldehyde, phenolic formaldehyde, bisphenol-epichlorhydrin, bisphenol-epichlorhydrin esters, maleic anhydride resin ester, and petroleum hydrocarbon.

Also, esterified congo resin, melamine formaldehyde, esterified resin, polyvinyl chloride, polyvinyl acetate, cellulose acetate butyrate, polystyrene, and polyethylene.

Films for wrapping food—dimethyl terphthalate condensate, ethylene glycol, polyvinyl chloride, polyvinyl acetate, polyviayl chloride acetate, polyethylene, polystyrene, vinylidine chloride, polyester resin ethylene terephthalate and ethylene isophthalate, and butadiene acrylonitrile styrene copolymer.

Also, cellulose acetate, regenerated cellulose, ethyl cellulose, butadiene acrylonitrile synthetic rubber, methyl acrylate, ethyl acrylate, rubber hydrochloride, butadiene styreae copolymer, and terephthalic acid ethylene glycol copolymer.

Grease-proofing and wet strength resins for paper wraps—polymer of 2-chloro-butadiene, polymer of melamine-formaldehyde, polymer of ureaformaldehyde, polymer of dimethyl, polysilozane, and copolymer of styrene and isobutylene.

Plasticizers—acetyl tributyl citrate, acetyl triethyl citrate, butyl stearate, butyl phthalyl butyl glycollate, p-tertiary butyl phenyl salicylate, dibutyl sebacate, di-iso butyl adipate, diethyl phethalate, and di-2-ethylhexyl phthalate (for food of high water content only).

Also, 2-ethylhexyl dipheyl phosphate, ethyl phthalyl ethyl glycollate, glyceryl monoleate, glycerin triacetate, monisopropyl citrate, paraplex G-60 and G-62, stearyl citrate, triethyl citrate, and 3- (2-xenoxyll)-1, 2-epoxypropane.

Stabilizers—aluminum monostearate ammonium citrate, ammonium potassium phosphate, calcium acetate, calcium carbonate, calcium ethyl acetoacetate acetate, calcium glycerophosphate, mono-di and tri calcium phosphate, calcium oleate, calcium recinoleate, calcium stearate and magnesium glycerophosphate.

Also, magnesium stearate, moni, di, trimagaesium phosphate, potassium citrate, disodium hydrogen phosphate, sodium citrate, sodium pyrophosphate, sodium tetraphrophosphate, tin stearate, inorganic salts of copper, magnesium, zinc stearate, and zinc resinate.

Driers—cobalt caprylate, cobalt lioleate, cobalt naphthenate, cobalt tallate, iron caprylate, iron naphthenate, iron linoleate, iron tallate, manganese caprylate, manganese linoleate, manganese naphthenate, and manganese tallate.

Colorants—Carbon black, oxides of iron, titanium dioxide, and ultramarine blue.

Release Agents—Acrawax C, DC fluid 200 (60,000 centistokes), methyl polysiloxane, microcrystalline wax, linoleic acid amide, oleic acid amide.

Also, palmitic acid amide, stearic acid amide, polyethylene glycol 400, 1500, and 4000, and polytetrafluoroethylene.

Antioxidants—butylated hydroxy anisole, butylated hydroxy toluene, nordihydroguariaretic acid, propyl gallate, and thiodipropionic acid.

Also, dilauryl thiodipropionate, distearyl thiodipropionate, resin guaiac, and 2, 4, 5-trihydroxy butyrophenone.

Antimycotics—sodium benzoate, sodium propionate, calcium propionate, propyl parahydroxybenzoate, sorbic acid, and methyl parahydroxybenzoate.

Source: "Quarterly Bulletin of Food & Drug Officials of the U. S.," Oct. 1956, p. 161-165.

atoms incorporated in their structure).

Extractability limits of one part plastic ingredient per million parts of packaged food (or simulated food solutions) may be considered acceptable. On the other hand, for ingredients of greater inherent toxicity, no more than one-hundredth part per million may be tolerated.

Prior to determining extractability, it is generally desirable to compute the concentration of ingredient which could be transfered by extraction from the package to the food contents, on the assumption that transfer would be complete. Such simple calculations may indicate that so little concentration of ingredient can occur in the food contents that no further testing is required.

It is important to note the possibility that no analytical procedure can be established due to inexact composition of an ingredient, or simply the lack of a reliable analytical technique. In such a case, acceptance of the given formulation will be denied and reformulation of the packaging material may be the simplest route to final FDA acceptance, short of complete animal-feeding studies.

Previously, where extractability levels which were determined for the compound(s) in question were considered acceptable and further testing unnecessary, FDA granted approval by an informal statement of "non-objection." More formality is now involved in the notification of acceptance or non-acceptance of the initial petition made for a specific plastic. Such notification will be published in the *Federal Register* in a format intended to minimize disclosure of "trade secrets" of production formulation and/or process technology.

Letters indicating "non-objection" to the use of a specific plastic formulation in food packaging have in the past been issued by the several agencies. The plastics manufacturer was then able to state, on this basis, that his product had been reviewed favorably, and that the specific formulation was satisfactory to the extent indicated. No extension of this acceptance could be made to any other use, nor could facsimile be made for advertising purposes.

### Formal OK Needed

Under today's changed procedure, FDA approval will be reported by publication of accepted petitions in the *Federal Register*. And FDA can take preventive legal action against unapproved packaging material in interstate commerce as well as penalize violators.

Based upon investigations by producers of plastic materials and by the several federal agencies, certain types of resins and ingredients have already been sanctioned or approved for food packaging (see panel). To this list should be added the more recent food additives generally recognized as safe (see FE Jan., p. 46), some of which may also be included in certain plastic formulations. Certain materials have been approved only for use with specific foods.

**Inclusion in these lists means only that a specific formulation of one of these compounds has been considered without objection. Another manufacturer's product of the same type cannot be assumed to be without objection until its complete formulation has been reviewed by FDA. Federal Register publication of orders approving specific ingredients should expand these lists in the future and materially assist in the formulation of improved packaging materials.**

Plastic materials manufacturers maintain a continuing vigil over polymer formulations and established as well as experimental products with reference to requirements



*For free reprint of this article, write M-2 on Reader Service Card, back of issue*

for federal sanction. To meet his responsibilities in this regard, the typical material producer—

1. Secures judgment and acceptance of his products under existing Government regulations;
2. Furnishes customers with documentation and interpretations of federal agencies' judgments of his products;
3. Reviews regulations involving plastic packaging materials and interprets these to his customers;
4. Provides advisory service and technical information to those industry groups engaged in improving legislation in this field;
5. Continuously monitors his product development programs to make certain that plastic formulations designed for food packaging use only those ingredients which will not bar FDA approval; and
6. Establishes reliable quality control procedures to maintain product factors continuously within limits established as acceptable to FDA.

For example, Monsanto's activities in this broad field are coordinated through the medical department director. In addition, the department keeps abreast of advances in toxicology as developed in other public and private laboratories.

Plastic packaging materials problems are the concern of the plastics division's research and technical service department. Other private laboratories are under contract to Monsanto to study specific problems from time to time. These make toxicity determinations by animal feeding studies, in addition to extractability measurements not conveniently handled by Monsanto.

For these analyses, private laboratories may be preferred in particular circumstances because of their background or greater experience in specific analysis of extractability and/or toxicity. Monsanto plastics division research facilities concentrate primarily on extractability testing for selecting new compounds for use in plastic packaging formulations.

### Immediate Need

Of greatest present use to the plastic industry would be a "recommended practice" for obtaining favorable FDA review of materials. This is being developed by the Society of the Plastics Industry.

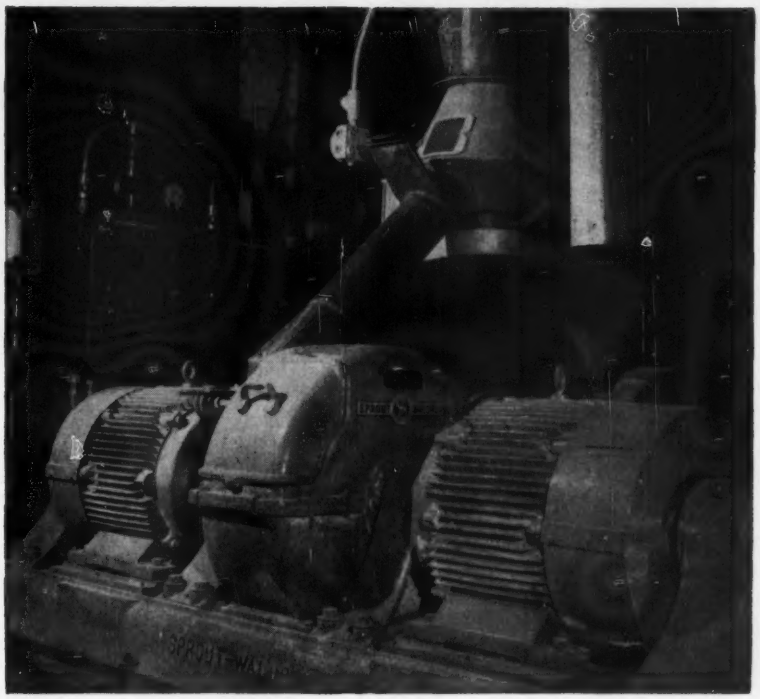
Such a practice would summarize and outline the efforts, both technical (analytical) and legal, required to comply with the new law in effective fashion. —*End*


SPROUT-WALDRON

S W Pointers

for Mixing and Blending • Size Reduction • Pelleting and Densifying • Size Classification • Bulk Materials Handling

Published in the interest of better processing by Sprout, Waldron & Co., Inc., Muncy, Pa.



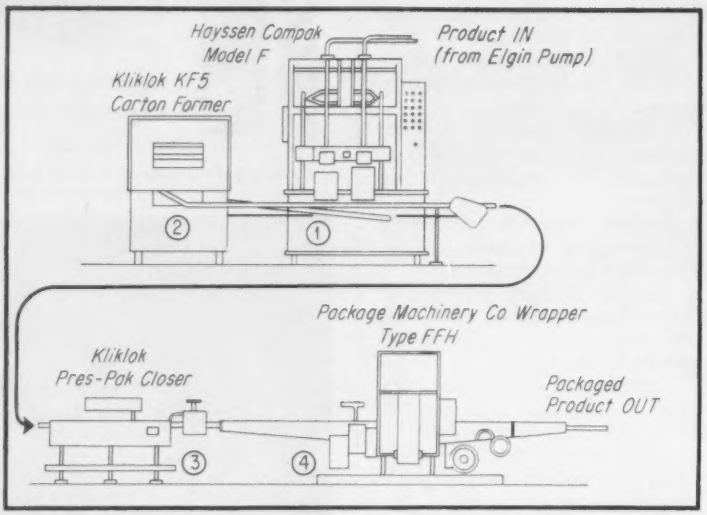
## STREAM SPLITTER KEEPS ATTRITION MILLS ON THE RUN

A few years ago the American Distilling Company installed a 26" Sprout-Waldron double runner attrition mill for the grinding of corn, milo, rye, barley malt and other ingredients used in the production of Bourbon Supreme Whiskey, corn and rye whiskeys and grain neutral spirits. The mill discharged into a mechanical handling system consisting of a screw conveyor and bucket elevator.

As the need for expansion became obvious it was decided to install an identical Sprout-Waldron attrition mill to operate in parallel with the existing machine, providing greater flow rate, reduced wear and simplified maintenance.

The key to the new system is a Sprout-Waldron Model VA-5 stream splitter with two outlets which divides the flow equally between the two attrition mills. Four whole grain storage bins discharge to a common Sprout-Waldron 12" x 18' screw conveyor. The center outlet of the conveyor allows the grain to pass over a magnetic separator on the way to the stream splitter. As the ground grain emerges from the attrition mills it is conveyed to the roof of the building by a Sprout-Waldron 50 hp 44" Pneu-Vac negative pressure system to another ground grain storage bin where it is held for further processing into quality whiskeys. For the facts on the Sprout-Waldron line of precision stream splitters, ask for Bulletin 137-B.

FOP/101




**LEAK-PROOF** polyethylene pouch fits snugly (left photo) into standard carton. Above: Compact line on which packages are produced.

# Cost Saving Pouch

**Easy to open, quick to defrost, economical polyethylene bag offers new merchandising advantages. And it may be used for many liquid-solid products.**

CONVENIENCE PACKAGING takes another big stride with introduction of a new package comprising a polyethylene pouch protected by a carton and overwrap. It's now being used to carry sliced strawberries.

Because they are mixed with sugar which becomes syrup, sliced strawberries have been packed in leakproof cartons—usually metal-end fiber containers.

This new development promises these impressive gains:

- **The polyethylene pouch may be immersed in luke-warm water and defrosted in a matter of 3-8 min., as compared to lengthy room-temperature defrosting of the block of frozen berries.**
- **Using the familiar TK-50 style frozen food carton, opening is easy —requires no knife. And after the product is defrosted, the contents may be poured from the pouch by simply pulling the tear-string.**

Further, there are some savings in materials. However, for the present, these economies are offset by increased labor costs and depreciation of capital investment in new and expensive equipment.

Developed by Western Waxide Division of Crown Zellerbach Corp., the package was produced at the Woodburn, Ore., plant during the 1958 season.

Quick to recognize its advantages, Shasta Freezers, Inc., Watsonville, Calif., has replaced its conventional metal-end carton line with equipment for filling and sealing this new pouch. Here, carton forming, closing, and wrapping is carried out on the standard units used for other products.

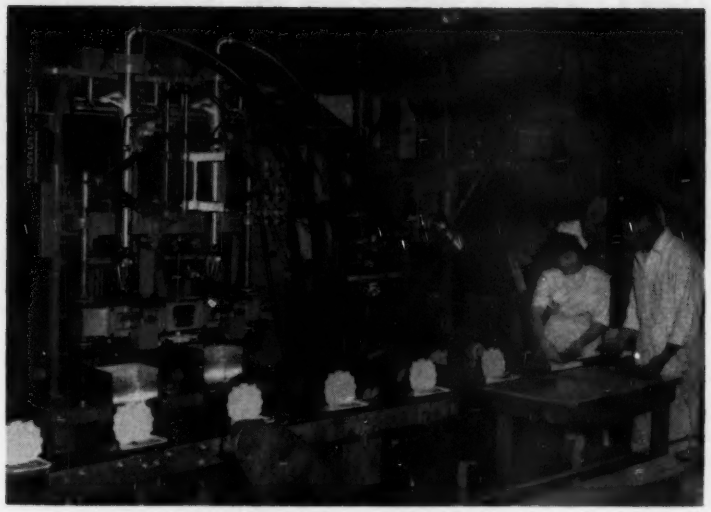
## Creating The Package

### To Spur Sales

Like many other frozen products, one quality offering of sliced strawberries may possess but few advantages over another of like quality, though brand recognition, even brand preference, may be developed by advertising. However, the consumer is easily persuaded to try another brand of equal quality if its price is lower.

In addition, strawberry production has skyrocketed. This has resulted in carryovers, such as those from the last season's pack—portending production cutbacks with their economic results. Most significant are the heavy carryovers of the retail size package.

Here, then, in the convenience



**POUCHES** are filled volumetrically on Hayssen machine (left), then sealed and conveyed to station (right), where they are manually packed into cartons.

# Boosts Berry Sales

features of Western Waxide's new pouch pack, is a singular merchandising advantage. With proper promotion it can be used to pep-up lagging sales.

## Package Specs

This 10-oz. pouch is formed of 2¼ mil (dual) polyethylene (9⅜ in. web on 3 in. core, with roll dia. 10½ in.). It is protected by a conventional frozen food carton (TK-50 style, 5¼ x 4 x 1⅛ in.) of 12 pt. carton board. The carton is overwrapped with the usual printed wax paper wrapper.

Although it appears to be as large as the 16-oz. tin-end carton, it contains 6-oz. less product.

The "mechanical heart" of this new packaging line is the Hayssen polyethylene unit. Pouches are seamed by a 24v. water-cooled impulse sealing device. Maximum capacity of the unit is 60 pouches a min.—30 from each of the two filling-sealing mandrels.

Product is mixed with sugar then pumped from mixer to the Hayssen by an adjustable, volumetric pump (see flow diagram). The two lines, from the pump to the back-pressure valves at the discharge ends of the two filling mandrels, remain filled. With each stroke of the pump's piston, the valves open and 10-oz. of product is discharged into pouches.

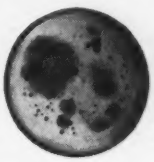
They are then seamed, cut off, and dropped onto the conveyor leading to the carton-forming machine. Here, they are manually packed in cartons and moved to carton closer and overwrapper. —*End*

**"It's our new carton for Swiss cheese —not only assuring optimum identity, but also saving 20% of material and affording product visibility."**

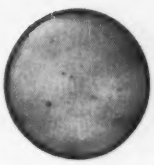
**Reduce spores and other air-borne contaminants with the**

# HONEYWELL ELECTRONIC AIR CLEANER

In the food processing and baking industries, spores and other microbial cells are costly enemies, producing damaging bacterial and fungal growths. The Honeywell Electronic Air Cleaner reduces the concentration of these spores and microbial cells by electronically trapping particles 100 times as small as those stopped by mechanical (fibrous) filters.



This plate was exposed to uncleaned air. Result: 104 colonies of bacteria and fungi developed.*



This plate was exposed to air cleaned by the Honeywell Electronic Air Cleaner. Result: Only 11 colonies of bacteria and fungi developed.*

*Actual unretouched photos of quantitative results using the sieve sampler technique. Each plate represents the microbial content of 31 cubic feet of air.

**PAYS FOR ITSELF!** Send coupon today to learn how the ELECTRONIC AIR CLEANER can pay for itself in your business.

MINNEAPOLIS-HONEYWELL
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Please send free copy of Electronic Air Cleaner booklet, "A Close Look at Air-Borne Dirt." We have the following problems:

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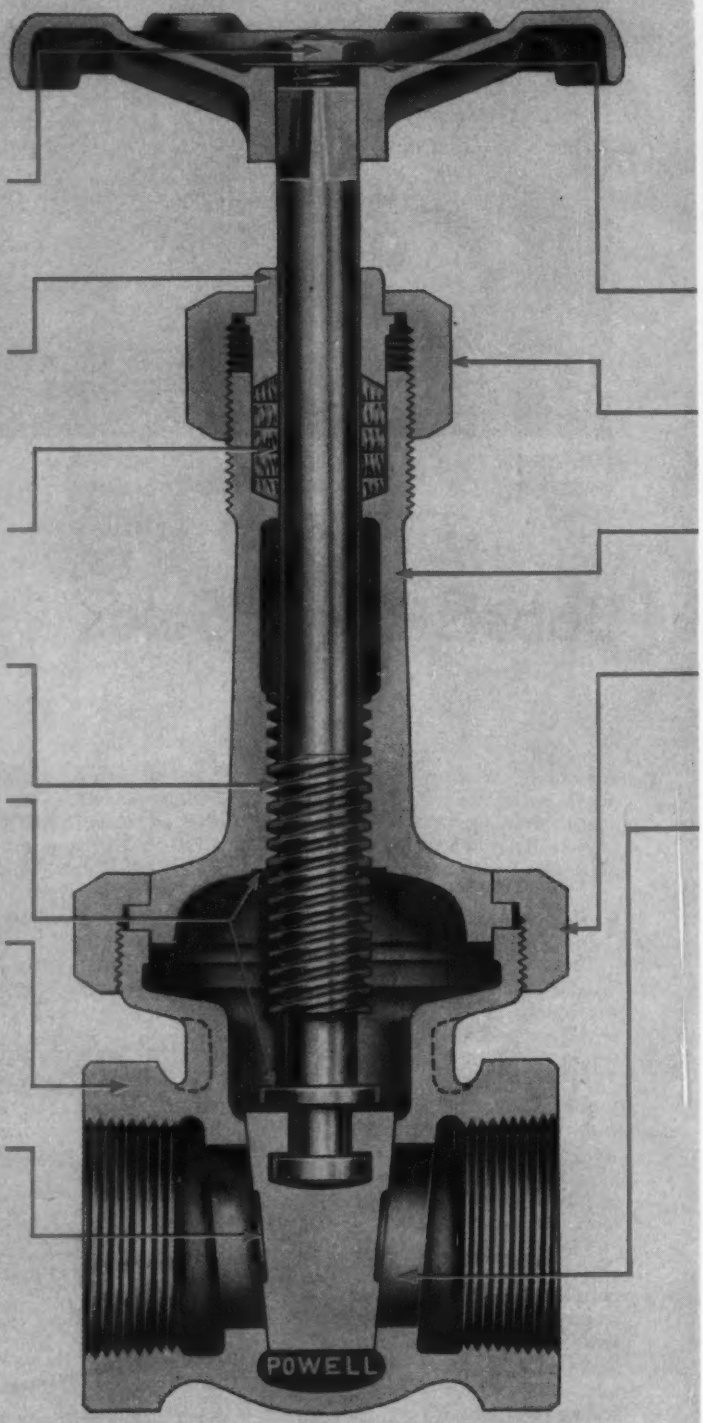
# ANNOUNCING NEW **POWELL**




**Handwheel Nut**—securely holds malleable iron, non-heating handwheel to the stem.

**Protruding Packing Gland**—a Powell feature—compresses the packing, offers additional guidance to the stem, and prevents packing nut from becoming loose and rotating with stem.

**Deep Stuffing Box**—holds more than ample amount of high-grade steam packing.

**Stem**—is high tensile bronze, extra heavy, of large diameter, with long Acme threaded section.

**Repack-Under-Pressure Seat and Collar**—permit valve to be repacked under pressure when fully open.

**Body**—a high tensile bronze casting, scientifically designed to provide full flow area through the valve.

**Wedges**—Interchangeable Solid or Double Wedges are available in rising stem valves. They are held to stem by a "T" slot, and are accurately guided to valve seats by means of integral cast lugs that travel in female guideways in the valve body. Entirely clearing the waterway, full unobstructed flow through is assured.

**Sectional**—Union Bonnet Rising Stem Gate Valve Fig. 2700—125 pounds, Fig. 2714—150 pounds.

**POWELL**...world's largest family of valves

# BRONZE UNION BONNET GATE VALVES

## for 125 and 150 pounds WSP

**These new BRONZE Union Bonnet Gate Valves have many superior features—some of which are outlined here. For complete details, write for new illustrated circular. Or check with your nearest Powell Valve distributor.**

**Identification Plate**—gives Figure Number and kind of valve.

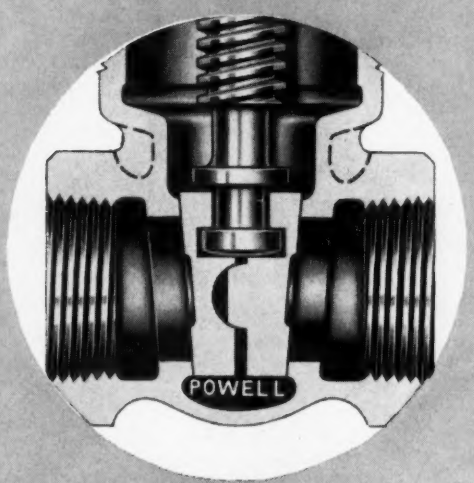
**Heavy Hexagonal Packing Nut**—for holding gland and adjusting packing.

**Long Bonnet**—cast of high tensile bronze for long service.

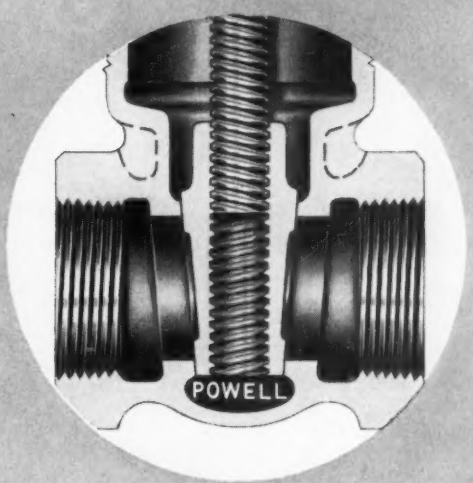
**Octagonal Ring Nut**—is deep threaded and tightly holds body-bonnet connection. Affords additional wrenching positions.

**Ample Space**—between seats and end of pipe thread prevents injury to seats when screwing pipe into the body.

**Fig. 2707**—125-pound Union Bonnet Non-Rising Stem Gate Valve. Also available for 150 pounds—Fig. 2712.

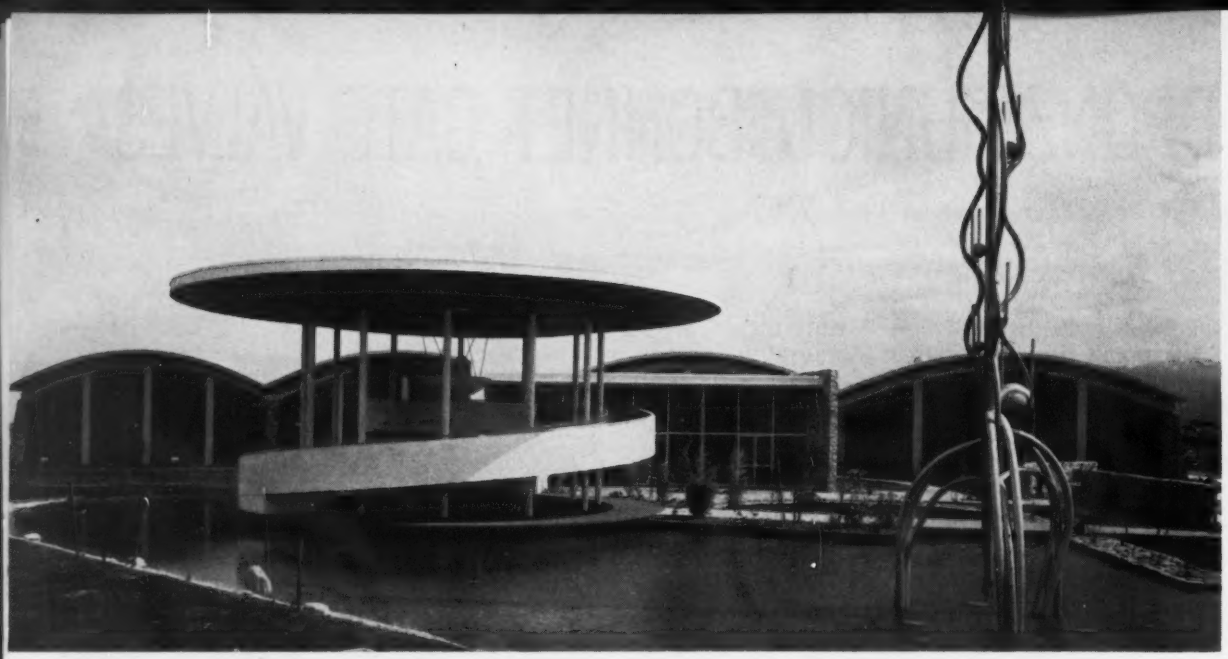



Detail of Sectional View Inside Screw Rising Stem Gate Valve showing Double Wedge Disc and Integral Seats.




Detail of Sectional View Non-Rising Stem Gate Valve showing Solid Wedge Disc that rises on stem. Integral Seats.

**THE WM. POWELL COMPANY** • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**



**INCLINED RAMP**, protected by rotunda, leads to elevated walkways from which visitors view the winemaking. At end of tour, they converge on tasting hall (center). Aluminum 67-ft. fountain (right) symbolizes effervescence of champagne.

# Precedent-Breaking Winery

**Its revolutionary new "CQT" champagne system triples daily output of bottles. And modern design streamlines outstanding plant that's sparked with new efficiencies**

A RADICAL DEPARTURE from the traditional pattern of wineries—in terms of advanced architecture, special plant design, and boosted efficiency—marks the new Saratoga, Calif., plant of Paul Masson Vineyards.

Moreover, this $2½-million facility is one of the first employing CQT (controlled quality transfer), which modernizes the classic art of manually disgorging champagne.

Two major dictates motivated the aesthetic yet functional design of this plant:

**First:** a keen insight into public relations led to the considerable investment in the visitors' ramp and overhead walkways. Management was mindful here of the aura of romance built around the ancient art of making fine wines and champagne—a factor attracting many visitors.

To take maximum advantage of this interest, we employed the noted architect, John S. Bolles, to design and creatively landscape the front of the building. And with special attention given the facility's interior elements—including the overhead visitors' walkway, handling units, and modern-sanitation features—the plant bears close resemblance to the attractive new "showcase" dairies.

**Second:** Since the plant, set on a 17-acre tract, is in an area of fine homes, the city's planning commission required that its facade be in keeping with the high character of the neighborhood. Of equal importance, good community relations—now recognized as of intrinsic industrial value—prompted even greater attention to design detail and warranted the added expense.

The architect has captured a lightly modern, gay aspect by setting the ramp and its rotunda beside a gem-like pool that is accented with an unusually designed fountain. In operation, the fountain's aluminum spheres rise and fall on water jets to symbolize the bubbles in champagne. Fine background lines are provided by undulations of the plant's trussed roof.

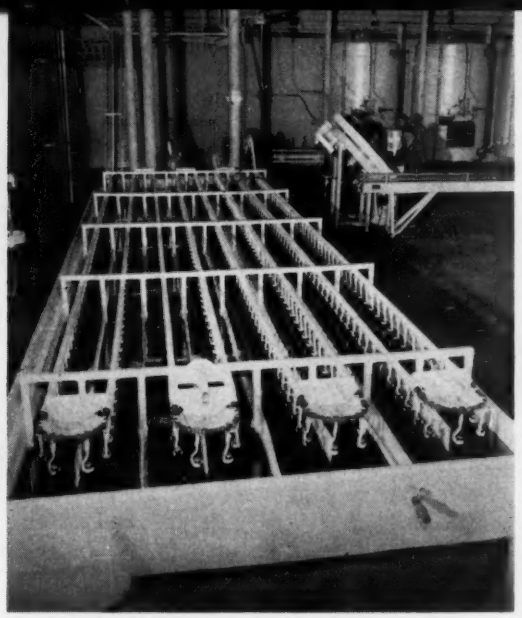
Behind this facade, the plant is entirely functional. There is ample room for future expansion, as well as for the most modern equipment. And with its 1,400,000-gal. cooperage facility and a 100,000-case warehouse, this is one of the largest and most modern of premium wineries.

Offices, laboratory, and engine room are in the center of the 3½-acre building. Although well equipped with modern communications systems, vital winemaking operations are closely adjacent to both office and laboratory. Pipelines (from the engine room for refrigeration and steam) were effectively shortened by virtue of the processing area's centralized location.

With the exception of casks, which must be mounted on footings, all tanks are set on concrete pads for efficient sanitation. Additional sanitation is achieved by crushing grapes at three remote vineyard locations. Wine is then shipped by tank-truck or rail car to this centralized plant.

Masson's CQT champagne system, which breaks from tradition by obsoleting manual disgorging, was devel-

**LEO A. BERTI,**
Vice-President, Paul Masson Vineyards, Saratoga, Calif.



**WITH CQT SYSTEM,** wine is chilled to 26F. as bottles are conveyed through tank (left). Then caps are removed and wine semi-automatically disgorged on star unit for transfer to one of the 1,200 gal. refrigerated tanks (rear).

oped by Winterwerb Streng & Co., Maschinenfabrik, Mannheim, Germany. This new method brings these three impressive gains:

**▶ It permits one worker to disgorge 6,000 bottles (5ths) in a 6-hr. day, contrasted to but 2,400 bottles in an 8-hr. day by manual disgorging.**

**▶ It aids in producing more uniform quality and pressure of champagne with far greater brilliance and clarity.**

**▶ When it has entirely replaced the manual method, it will release costly plant space now required for the riddling room. At Masson's, 50,000 bottles of champagne are stored in riddling racks for 4-5 weeks. Each hour these racks are automatically vibrated and each day every bottle is manually revolved to cause the natural sediment to reside in bottle necks.**

## Semi-Automatic Operation

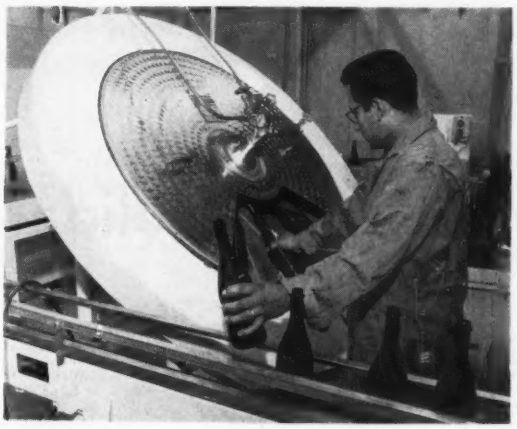
Champagne, aged 2 yr., is conveyed from brut cellars by overhead Chain-Veyor, which descends into the 600-bottle chill tank. Propylene glycol (incoming at 18F., existing at 21F.) reduces wine temperature to 26F. to obviate foaming when bottles are uncapped.

The ten disgorging spouts of the star unit extend deep into bottles, which are automatically clamped against gaskets. As the star turns, wine is emptied by gravity into the CQT system, which is uniformly pressurized by $N_2$ at 5 atmospheres. It is then pumped to one of two 1,200-gal. refrigerated transfer tanks equipped with agitators. Unlike manual disgorging, where some wine and gas are lost when the frozen core is popped from the bottleneck, all wine and $CO_2$ is claimed by this system.

Much higher product uniformity and quality are gained by blending 1,200 gal., and mixing the dosage

## Tedious Old vs. Speedy New

**MANUAL DISGORGING** necessitated freezing bottlenecks in tank of brine (right) and uncapping (center) to permit $CO_2$ pressure to pop out frozen core. Lost wine was replaced by re-filler (left).



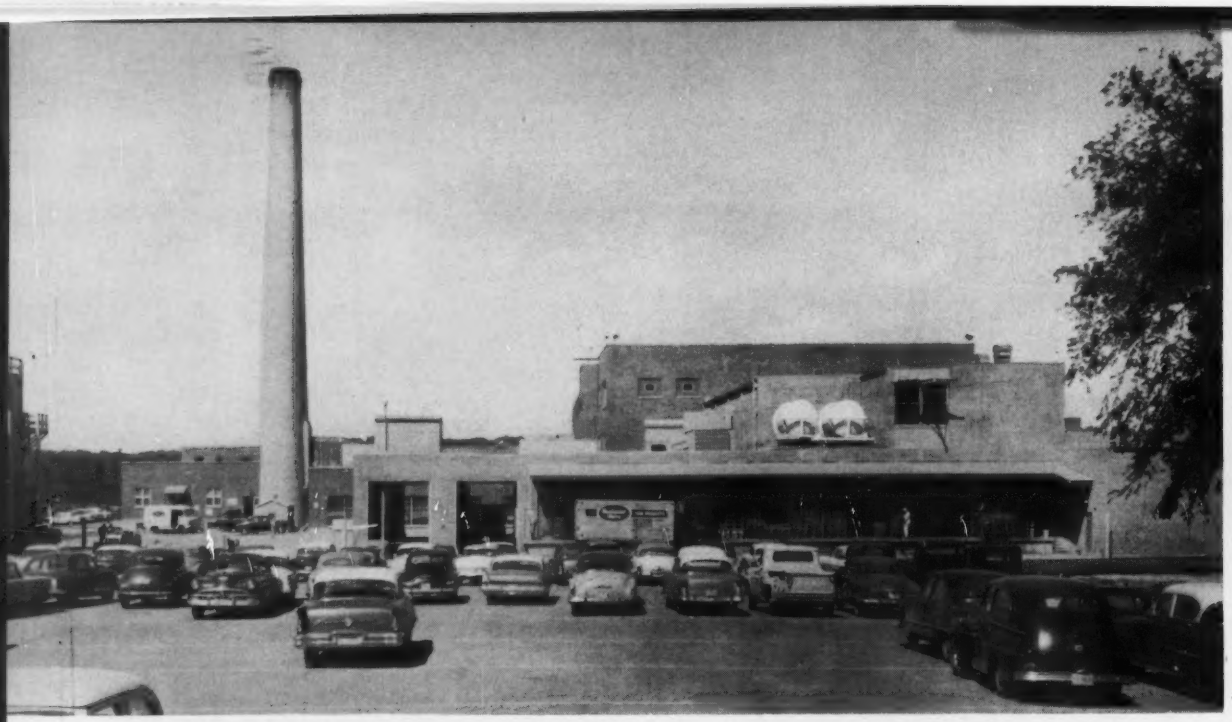
**STAR UNIT** has 10 rotating disgorging spouts. As it turns, bottles empty into pressurized system that moves champagne to refrigerated tanks.

liqueur in this large volume of wine, than by hand disgorging. With the latter method there is no blending of wine, and dosage is measured into each bottle at the refiller. ("Dosage": A blend of fine wines and granulated sugar added to champagne to create characteristic flavor and type.)

From the transfer tanks, wine is pumped through a sterile filtering unit, which positively removes all sediment, and thence to a bottling tank. Again, in hand disgorging, it's impossible to remove all yeast cells from wine.

At the bottling tank, a measured amount of dosage is blended with the wine, whereupon it is allowed to rest 24-hr. This tank is then overpressurized by the addition of 1 atmosphere of $N_2$ (total 6 atmospheres), and the wine moves by counterpressure and gravity to the filler-bowl. All product contact surfaces in this system are of stainless steel. The finished champagne is finally bottled in splits, 10ths, 5ths, magnums, or jeroboams.

*—End*



**MILK-BOTTLING OPERATIONS,** formerly scattered in six areas, are now centralized in this plant. Process improvements extend product shelf-life and effect big savings.

# Consolidation Brings Economy

"TODAY'S PLANT built for tomorrow." That's how we rate our new facility. It yields the big benefits of consolidated operations. And its processing innovations give us a new high in efficient production of a wide variety of products.

We built this plant because we had been forced to toe the cost line. Our milk-bottling operations were scattered in six locations: Rochester, Minn.; Decorah, Iowa; and Albert Lee, Winona, Mankato, and Blue Earth, Minn. These became increasingly difficult to operate and costly to maintain. So we decided to centralize operations largely in Rochester.

Our original plans called for a plant handling 75,000 lb. of milk per day (8-hr. shift). Six months later, plans were tossed aside because of increasing sales. A year later, we targeted production for a present 150,000 lb. per day and for a future 250,000 lb. We plan to expand our market.

By consolidating operations into this one large Grade A milk plant, we have lowered unit costs on a fixed-asset basis and extended deliveries to a 150-mile radius. The five divisional plants now serve as distribution centers.

Products are shipped to these distribution centers and to jobbers in our eight mechanically refrigerated (Thermo-King) vans and semi-trailers. Evening shipments arrive for next morning deliveries to consumers.

Shelf-life extension was achieved by installing three 50,000-lb.-capacity, Freon-refrigerated (35F.) raw milk storage tanks and two other tanks of similar capacity for finished products.

## Planned for Efficiency

With our new facilities, we have gone to a 5-day week, whereas we formerly operated 6 or 7 days. This brings significant labor and production savings without costly overtime.

How was this done? By planning production so that two extra days' finished products, processed by larger capacity equipment, could be refrigerator-stored. Our pasteurizer (plate type) is set to handle 25,000 lb. per hr. instead of the usual 10,000 to 15,000. And other operations, on up to the filling machines, have been geared to this capacity.

Notable in this respect is the installation of a Freon-refrigerated (35F.) holding tank ahead of the filling machines to keep the fillers constantly supplied.

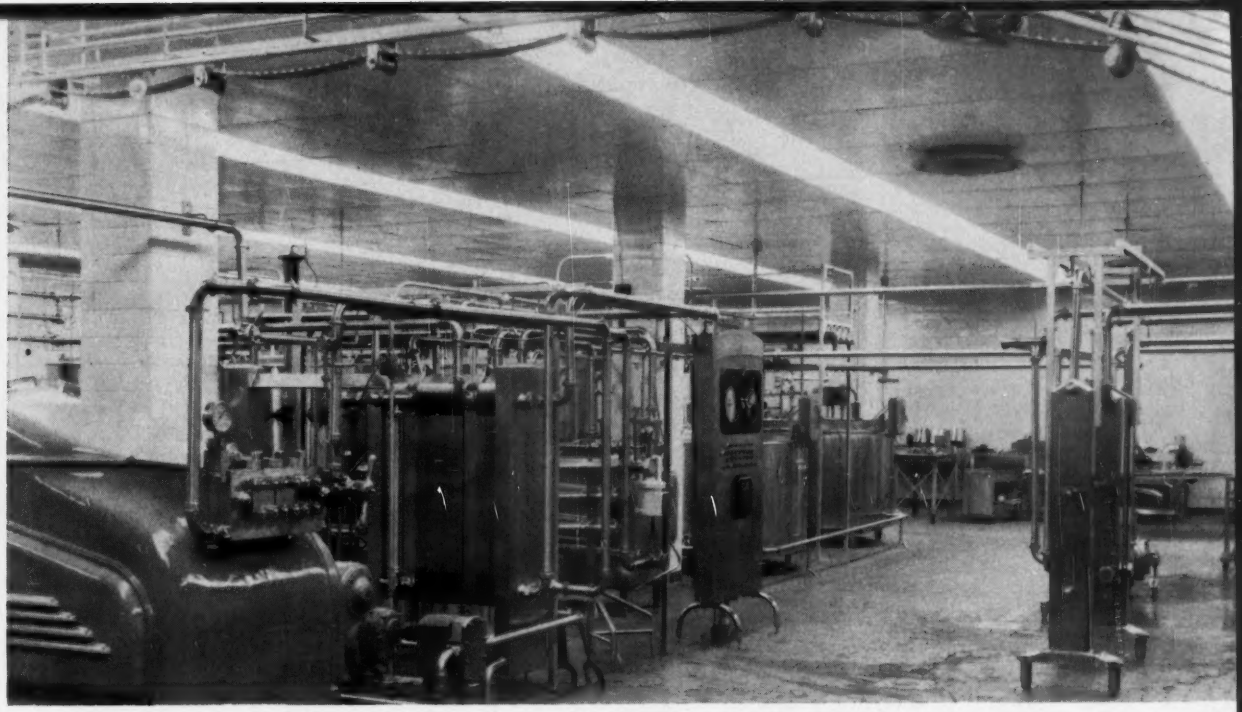
In planning this plant, emphasis was on elimination of bottlenecks and cross-traffic, as well as synchronizing machine speeds for top efficiency.

The manufacture of ice cream is carried out independently, mixes being furnished from an adjacent tank.

Separate lines are provided for milk and byproducts. Former practice of running milk and byproducts through the same line was inefficient. The plant manager spent consider-

**FRANK HACKMAN and HENRY MASS**

Respectively, Plant Manager and Maintenance & Engineering Superintendent, Rochester Dairy Cooperative, Rochester, Minn.



**PROCESSING** in this milk area has been geared to handle 25,000 lb./hr., instead of common 10-15,000. As a result, Rochester Dairy has gone to a 5-day (instead of 6- or 7-day) week, with no costly overtime.

**New dairy plant built for today and tomorrow puts six plants into one. Advanced ideas and facilities up quality, cut overtime, boost efficiency.**

able time setting up a complicated production schedule. Production down-time for switching amounted to 20 or 30 min. And reclaiming of the product remaining in the line by running water through it still entailed losses of fats and solids.

## 10 Advanced Features

In our cheese operation, quality control is assisted by an enclosed starter room. It is equipped with germicidal lamps (ultra-violet) and maintained at a slight positive air pressure to keep out airborne contamination.

Because storage tanks are located on the second floor, remote-reading liquid-level gauges (King) and push-button, pneumatically operated valves (Valvair) were installed on the first floor for convenience.

Ceiling-suspended utility pipes (for air, hot and cold water) in 1st- and 2nd-floor processing areas are eliminated. Pipes, instead, are centralized into stainless steel, panel-enclosed, vertical service "islands."

Easy-to-remove aluminum panels provide ready access to pipes installed above the false ceilings. And heated air is forced through false-ceiling space at a 13,5000-cfm. rate to keep out dust and prevent condensed moisture from dropping into processing areas. Coil-heated air (70 F.) is purified as it passes through an automatic dispensable roll-fed filter cloth.

For sanitation, dust-control, and maintenance reasons, windows have been abolished, except for a 2nd-floor window in the supervisor's office. This window permits transfer of equipment in or out of the plant by a hoist.

To keep dirt out of the plant, the automatic case-washing machine is located in an enclosed room adjacent to the unloading dock.

Some saving in refrigeration is gained through use of a telescopic belt-conveyor. It extends to carry ice cream packages from filling machines into the hardening room. Then it retracts to seal hardening room and prevent cold air leakage.

Fruit flavors are cold stored (35F.) in a separate room. This prevents fruits from "bleeding out" of the ice cream.

Flexibility has been engineered into handling of packaging materials (roll stock and knocked down cartons).

An RR spur that's built into the new Grade A warehouse supplies materials either directly (by conveyor) from cars to fillers, or to a 1 million-carton-capacity company storage area.

The storage area is dehumidified so that cartons formed from the roll stock will absorb a maximum amount of wax coating.

## Steam Economy Effected

A centralized hot water system saves steam and avoids overloading boilers in a nearby utility plant. Steam (10 psi.) is piped into a 4,000-gal., coil-equipped storage tank, where the water is heated and thermostatically tempered by a cold-water injection system.

Hot water is piped about 20 ft. to a booster tank, where the temperature is raised from 165 to 185F. before the water is pumped to processing units. This tank is equipped

(*Continued on page 61*)



CIRCLE 54 ON READER SERVICE CARD→

Hauling fruit from grove to processing plant, these Macks work day-in, day-out for Minute Maid Corporation.

# Frozen sunshine on the move

On 1,000-mile highway express runs, Minute Maid Corporation counts on Macks for economical, round-the-clock deliveries.

Hauling high-tonnage loads of fruit out of sandy groves and to the processing plants . . . fast over-the-road deliveries of frozen concentrates to distant cities. Dependable, on-schedule performance of this operation for the world's largest producer of frozen concentrates becomes routine when Mack trucks are on the job.

Mack trucks on the job reduce hauling expense because only in Macks are combined the proved cost-saving advantages of famous Mack Thermodyne® engines and the long-lived efficiency of other Mack-built components. Only because Mack builds all its own vital components can it maintain the most rigid quality control of any heavy-duty truck manufacturer in the industry.

For more miles per gallon, less downtime, stand-out performance . . . Mack has the unit that can reduce your operating costs. Your local Mack branch or distributor will be glad to explain in detail which Mack will best suit your requirements. Mack Trucks, Inc., Plainfield, New Jersey
In Canada: Mack Trucks of Canada, Ltd.

**MACK**
FIRST NAME FOR
**TRUCKS**

# "15% sales increase due largely to Knox-designed jar," says president of leading gourmet foods firm

The handsome fluted glass packages shown above were designed by Knox Glass, Inc. in 1957 for a leading Eastern manufacturer of gourmet foods.*

According to the firm's president:

"Sales increased nearly 15% after changing to the fluted jar which Knox Glass designed exclusively for us.

"The eye-catching salesmanship of the jar, which has no label other than the closure, permits the purchaser a clear, clean view of our appetizing products, such as Potato Salad, Cole Slaw, Macaroni Salad and Vegetable Chow Chow. Knox's strong design and the excellent quality of the glass we buy from Knox, combine to make this a wonderful package.

"We've been a Knox customer for nearly seven years and buy almost exclusively from them. Special quality products such as ours demand high quality glass and exceptional service. This we get from Knox."

Find out more about how Knox can meet your glass container needs — contact Knox Glass, Inc., Knox, Pennsylvania.

*Name available on request.

*the new*/**KNOX GLASS**

Control panel of automatic Recrystallizer plant. Photograph by Loebel.

## International discovers new purification process...brings automation to salt refining

Last fall, after more than a decade of research, International Salt Company perfected the first new method of salt refining in over 150 years. This process has as its basis one of the most unusual facts in industrial chemistry: The major impurity in salt crystallizes out of solution as the temperature rises . . . while salt itself crystallizes out as the temperature drops.

In International's new process, a slurry of salt and brine is heated to 225°F. The salt goes into solution, and impurities (which remain undissolved) are separated out. Then the brine is flash-cooled to 140°F. Now pure salt crystallizes and is filtered out while any remaining impurities go into solution.

This process makes possible, for the first time, continuous, automatic refining of salt. With one man in control, International's new Recrystallizer at Avery Island, La., produces high-purity salt in one-third the time of conventional purification.

The scientific skill and research facilities that provided this "step ahead" are also at the service of any salt-using company. Contact International Salt Company, Inc., Scranton 2, Pa., or any of the offices listed below.

**STERLING SALT . . . product of INTERNATIONAL SALT CO., INC.**

**First in salt technology . . . . first in salt for industry**

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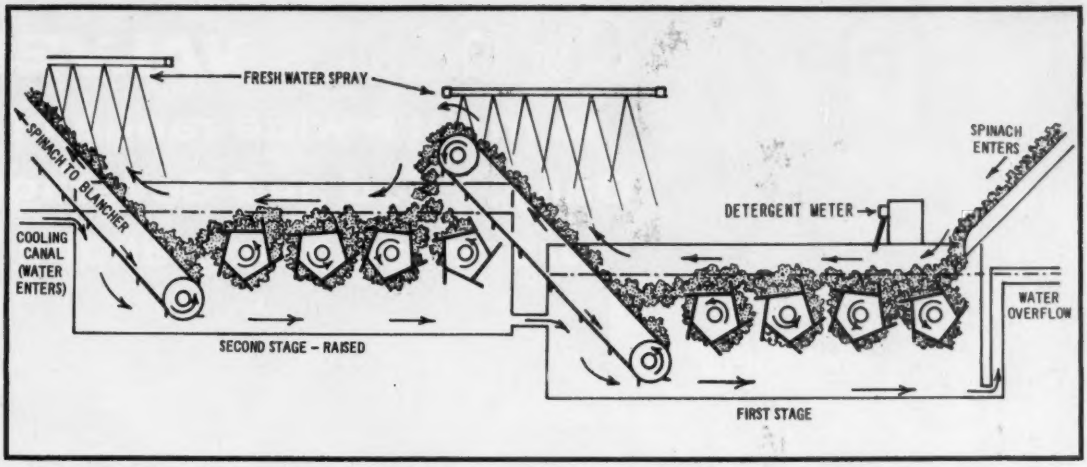



**SPECIAL SPINACH WASHER** has meter that feeds detergent solution to washing compartment. Also note two sets of fresh-water sprays. Sludge and other contaminating materials are removed continuously through water overflow (extreme right).

# How Detergents Improve Produce

**Used in minute amounts, they enable conventional washers to remove more soil, bacteria, insecticide residues. And vegetables appear brighter, have greater shelf-life**

PRODUCE QUALITY can be preserved for a longer period–and appeal improved, too–by washing with detergents.

This has been demonstrated by field studies over a 2-yr. period. They were applied to two segments of the industry: (1) Fresh produce to be packaged in cellophane for chain store sales, and (2) fruits and vegetables to be canned and frozen.

## Water Needs a Booster

In preparing fresh produce for marketing or for canning and freezing, various washing procedures are used to remove field soils, bacteria, and insecticide residues.

Washing with water alone, however, has not proved entirely satisfactory, particularly falling short against bacteria and spores. So addition of detergents and/or wetting agents was considered and tests set up to determine their suitability.

Formulating a detergent for these tests called for attention to certain basic factors. It had to be–

- **Nearly tasteless and non-toxic, to avoid harmful effects from accidental consumption.**
- **Superior in wetting-out ability, to remove field soils, bacteria and their spores, and have detergency to remove insect eggs, chemical residues, and molds.**
- **Free-rinsing, even with limited spraying procedures, and**
- **Relatively non-foaming, because most washing equipment is of either the spray or flume type.**

In conducting our tests, two types of washers were employed:

**1. The flume spray,** most often used in preparation of package produce. Here, water conveys products through washer into next stage of processing or packaging. Spray banks provide additional coverage.

**2. The combination soaker-spray unit,** widely used for tomatoes and oranges. This unit conserves water, minimizes bruising, and is easily geared to production speeds.

## Microorganism Control

To check the effectiveness of our detergent, we worked at a large chain store warehouse where a flume-spray washer was used on leaf vegetables. Officials had complained of high bacteria counts and short shelf-life of their tossed salad.

We first plated out samples of the product cleaned by the regular procedure. Overall counts averaged approximately 350,000 organisms per g., while gram-negative organisms averaged about 8,000/g.

Then, without changing any equipment or the cleaning routine we added ¼ oz. detergent per gal. of water in the flume–and plate counts were immediately reduced to approximately 19,000 and 1,300.

The detergent-washed salad showed a 95% reduction in overall plate count, and an 83% reduction in total gram-negative organisms. Tests were repeated at separate intervals with similar results.

From the tests, we learned that it is possible to remove microorganisms from produce even in highly infected wash water, as long as the final rinse is of good quality.

## Comparative Shelf-Life

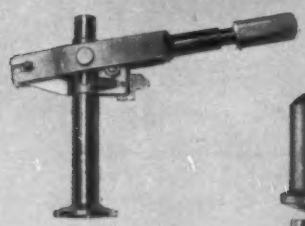
A second test was conducted by a large West Coast chain store on four vegetables: Broccoli, celery, romaine lettuce, and radishes with tops. Object was to compare shelf-life of vegetables washed by standard techniques with detergent-washed products.

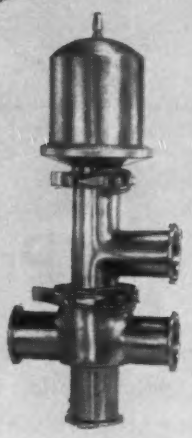
Control samples were taken,

**ALBERT W. EMERY,**

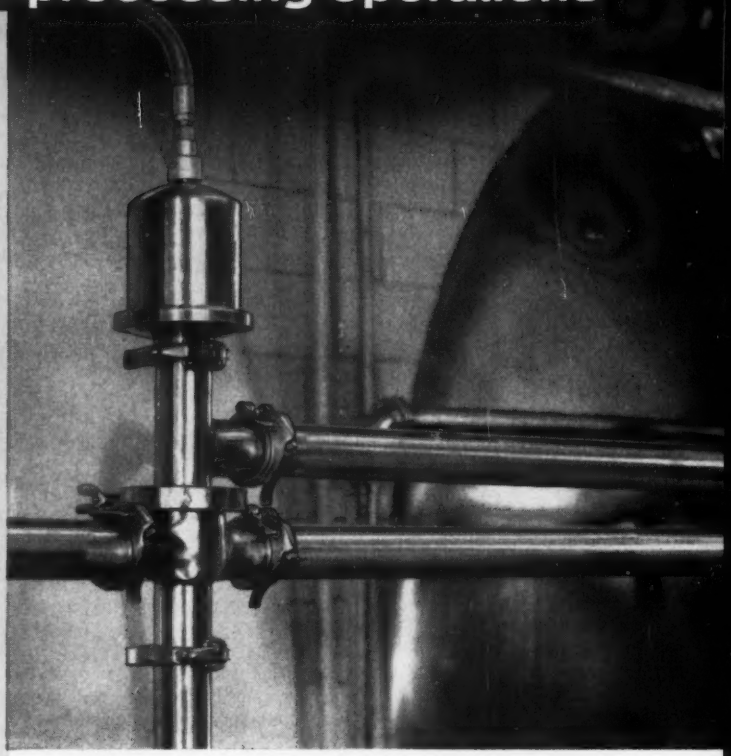
Food Industries Div., Oakite Products, Inc., New York City

# TRI-CLOVER
# Air Actuated VALVES
## to meet a wide range of Dairy, Food and Beverage processing operations

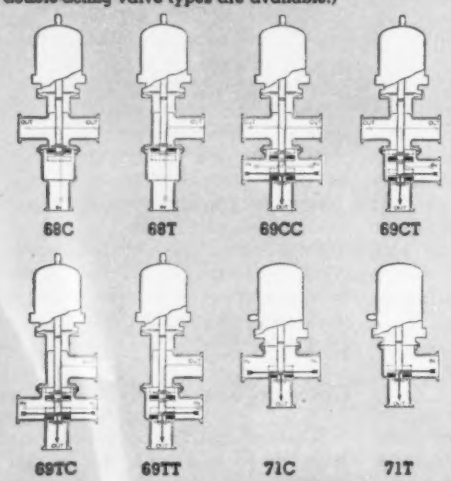




**Above:** Close-up of handle assembly which replaces air actuator when manually-operated valves are required. *Right:* Close-up of new Tri-Clover Air-Actuated Valve, with air actuator in place, showing how units are easily assembled with Tri-Clamp joints. (Valves also available in Bevel Seat construction)



The drawings below show the various Tri-Clover Air-Actuated Valve arrangements available. The *black* arrows show inlet and outlet ports when the plug is in the "UP" position. Inlets and outlets when the plug is lowered to the "DOWN" position are indicated with the green arrows. Valves are available in 1½" and 2" O.D. sizes as standard. Data on sizes up to 4" available on application. (Note that both single-acting and double-acting valve types are available.)




Tri-Clover Division's Air-Actuated Sanitary Valves permit easy application of automation and automatic control to many phases of processing and cleaning operations in the dairy, food, and beverage industries. These efficient, air-actuated valves can be locally controlled . . . or remote-controlled from any plant area. Advanced design makes them ideal for use in completely automated installation, such as recirculation operations for in-place cleaning . . . or in a single operation, such as on a filling machine. Manufactured from type 304 stainless steel, these efficient, remote-controlled valves offer fast, positive liquid flow control in any line location, with accurate local or remote control.

Built to extremely high sanitary standards, Tri-Clover Air-Actuated Sanitary Valves assure maximum uninterrupted flow, with a minimum of agitation and friction.

*For full details, write for Bulletin A-658, or see your nearest Tri-Clover Distributor.*

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washed, and stored under exactly the same conditions as the detergent-washed produce. Flume water temperatures were the same, and both sets of samples were packaged and stored in a room with a temperature of 50F. (where all packaging is done). All samples were examined three days later. Results:

**1. Broccoli:** Detergent-washed sample showed a definite improvement over control. It was greener, in much better condition, and did not show any signs of yellowing or flowering.

**2. Celery:** Detergent-washed stalks were whiter, more turgid. Control was limp, dehydrated, and brownish, indicating preliminary stages of decay on outer stalks. Extensive trimming was necessary on control sample.

**3. Romaine Lettuce:** Detergent-washed stalks were whiter, and whole head had a crisp, fresher appearance and feel as opposed to limp, wilting appearance and feel of control sample.

**4. Radishes:** Leaves washed with detergent were fresher and greener, and there were no signs of yellowing. Control sample had turned significantly yellow and was badly wilted.

After five days, another inspection showed that almost all of the control samples were unfit for consumption. True, the detergent-washed samples required extensive trimming —but they were still salable.

This was one of a number of tests conducted, all of which point to longer shelf-life when the produce is properly washed with a detergent followed by an adequate rinse.

## Eggs and Bacterial Spores

A test was also run on the washing of 600 boxes of tomatoes prior to canning. The first 300 boxes were washed in the regular way, while the second 300 were treated with a 25-ppm. detergent solution. Flume water temperature was 75F. in both cases. All counts were carefully tabulated in a laboratory. Plain water removed 73.3% of the drosophila fly eggs and 83.7% of the bacterial spores, whereas the detergent solution removed 94% and 92.6%, respectively.

We have also completed a series of tests on cucumbers showing that the Oakite detergent removed a higher percentage of lindane which, if not removed, would contaminate the brine solution.

This insecticide is used in standard spray concentrations containing 1 lb. of 25% wettable lindane per 100 gal. of water. There are variables, of course, but cucumbers treated at this concentration may be expected to contain about 11-ppm. residue.

In contrast, the highest concentration of lindane detected, in our work, on cucumbers entering the brine solution was 1.07 ppm., and this was found at only one plant. We were able to reduce this by 86% simply through installing a detergent-fed spray washer and rinse before the brine vat.

Other work in this field was in removing DDT from spinach. By use of a detergent solution and ample agitation in the soaker compartment, removal of this insecticide was greatly improved. We were able to bring this product well within the permitted tolerances.

Although our detergent is absolutely harmless, we were interested in checking amounts remaining following good rinsing procedures.

This rinse consisted of four banks of sprays located 8 in. above the product, which passed beneath on a roller conveyor after leaving the soak tank. Nozzles directing these sprays were of the full-cone type.

Results at four separate plants where these tests were conducted: "No detectable residual detergent on the product."

## About Wetting Agents

Numerous studies have indicated the advantages of using wetting agents, rather than plain water, in washing vegetables. And on testing provided confirmation, particularly in removing bacteria, aphid type insects, and organic debris.

We found, however, that wetting agents were not nearly as effective as the formulated detergent for removal of: (1) Soils (sand on asparagus); (2) molds (fruit type on oranges and peaches); (3) insect eggs (drosophila eggs on tomatoes), and (4) sprays or wax (from apples and cucumbers).

We are presently experimenting with the washing of root crops and tubers subsequently packaged in cellophane in small quantities. Work is also being done on the washing of shell fish after the shells have been removed.

We believe the evidence accumulated over the past six months will alter present techniques in the preparation of package produce. And perhaps it will not be too long before most of this food is cleansed with a detergent prior to packaging.—*End*

FLEXIBLE STEEL CONVEYOR BELTING

THIS multi-purpose, galvanized steel conveyor belting has all the features required to simplify and expedite the continuous movement of food on stationary or portable conveyors. From receiving platform, through processing and packing to shipping dock, it renders top-flight service at surprisingly low cost.

The rugged open-mesh design that assures a positive drive on the sprocket, eliminates tracking problems. It also permits free circulation of air and liquids around products in process, facilitating canning, freezing, pickling and dehydrating. Besides, it speeds up sterilizing with steam gun or scalding water. The metal surface is impervious to oil, grease and bacteria and will not pick up off-flavors or odors.

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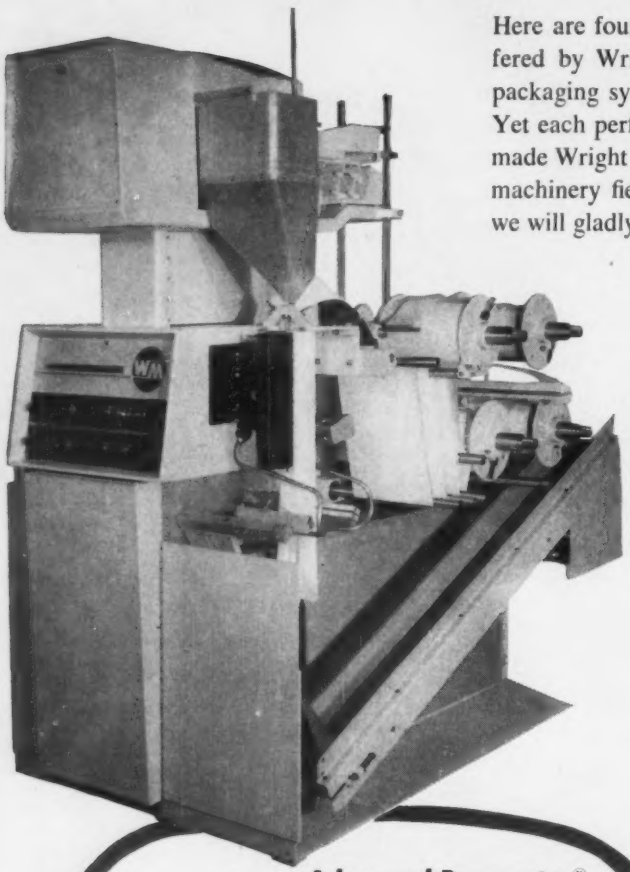
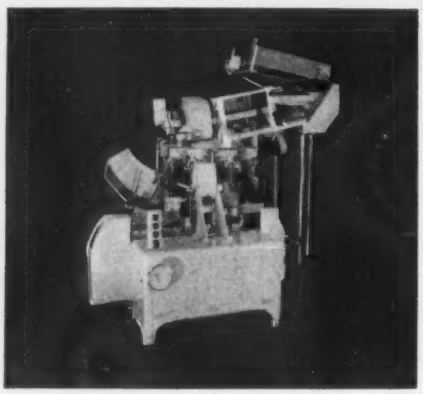


***Advanced Bagmaster®***

100% automatic, complete packaging system. Makes the bag, electronically weighs and fills the product, and seals the bag. Advance features permit the precision packaging of even such fragile and multi-dimensional products as potato chips.



**BAGMASTER® System**

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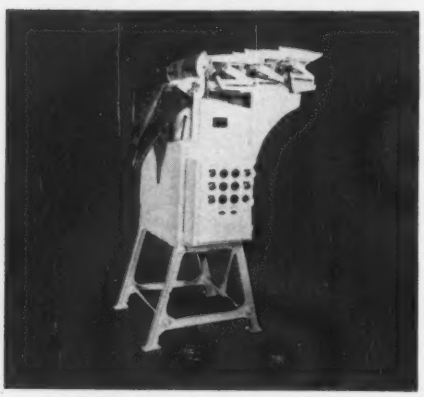

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Versatile, semi-automatic net weigher for the manufacturer whose packaging line must handle a wide variety of products and sizes. Only minutes to make change-overs.

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# Processes Get a Screening

**Spotlighted by Bakery Engineers in recent Chicago session are: Advanced baking methods, costs of continuous mixing, sweet goods requirements, and whey-solids performance**

**HEAT-TECHNIQUE ANGLES:** Dielectric heating methods could be applied for (1) defrosting frozen ingredients, (2) short-time bread baking (in conjunction with infra-red browning of crust, a method now used in Sweden for rye bread), (3) producing brown 'n serves, (4) inhibiting molds and bacteria (5-10 sec. exposure of wrapped goods), and (5) destroying insects in flour.

Infra-red can be employed to quick-bake cakes, cookies, and breads—also to dry certain other types of food products.

In ultrasonics are seen possibilities for homogenizing cake batters and icings.—G. S. Roberts, Anderson Clayton & Co., Dallas.

**CLOSEUP ON CONTINUOUS:** Revealed here were cost studies of the continuous dough method, covering production of 5,320 loaves of bread over a 180-min. period. Savings in ingredients amounted to $31, or $0.53 per cwt. of bread.

Studies also pointed to less bake-out losses and, consequently, new control of scaling weights. A 9-hr. production of 8,040 loaves brought material savings to $31.96, or $0.59 per cwt. of bread. Then, by accounting omission of dusting flour ($4.31, or $0.04 per cwt.), total material savings amounted to $36.27, or $0.64 per cwt.

Present disadvantages of continuous: Requirement of non-stop production of ferments; elimination of conventional equipment for buns, rolls, and variety breads; and present lack of facilities within outlay range of small operators.

Need remains for careful control. In short, production know-how is still necessary.—E. S. Mack, American Bakers Corp., Inc., Teaneck, N.J.

**MODEL FOR SWEET GOODS** operations is seen represented by facility comprising—

1. Department arranged to mechanically produce 3,300 packages of cinnamon rolls (8's) per hour, using conventional bread mixers. Dough trough is hoisted to feed hopper of recently developed extruder. Dough flow is regulated by sliding gate at one end of trough and raising opposite end.

2. New method of continuously extruding dough and discharging it through series of overhead belts (for 6 min.), then back to make-up belt, through oiler, oil spreader, cinnamon applicator, curler, and roll cutter. Rolls are conveyed up and over right-angle traveling pan conveyor. Filled pans are picked off at end of panning conveyor, racked, proofed, baked (tray-type oven), depanned, and cooled (multi-tier wire belt). Rolls proceed, without stop, through print-on roller-type icer and finally go to wrapping machine. Speed: 3,300 packages per hr.

3. Operation also built around extruder-type make-up unit to produce 3,000 packages of cinnamon rolls (8's or 9's) per hour or 4,200 coffee cakes. Except for Danish, all are from sponge-doughs with sponges produced in conventional bread mixer and doughs in similar unit with modified mixing arms.—S. V. Luber, Burny Bros., Inc., Chicago.

**WHEY-SOLIDS BENEFITS:** Economics and bakeshop performance of whey solids (nutrition-boosting lactalbumin protein, milk sugar, minerals, and vitamin B-complex) were evaluated in bread formulas at three levels: (1) 8% whey and no nonfat milk solids (existing levels call for 4%), (2) 2-4% whey to 4% milk solids, and (3) 2% whey and 2% milk.

Whey's economics are seen justified through its higher lactose and mineral salt contents. When used in place of milk solids, bread formula takes 3% less sucrose, ½% less salt. Using 8% whey solids, greater dough extensibility and process tolerances are achieved over a longer shop time to produce more uniform loaves.—W. L. Hood, Dainty Maid Bakery, Kinston, N. C.

—*FE Staff*

## *Consolidation Economy*

(*Continued from page 53*)

with a heat exchanger, also supplied with 10 psi. steam.

This hot water system has eliminated the hazard of workers being steam-burned at hosing stations ahead of processing units.

Work simplification has been achieved by installing an automatic case selecting-accumulating system (Lathrop-Paulson) between filling machines and cooler storage.

In the cooler room, a pneumatic unit automatically stacks five conveyor-fed cases and transfers the stack onto a floor-level conveyor.

A dual-purpose handling system—loading 5-high cases onto conveyors, plus palletized loading of 30 cases—is employed for flexibility in truck loading.

A vacuum cleaning system picks up milk or water from the cooler floor. This eliminates splashing of water or milk against the finished-product bottles.

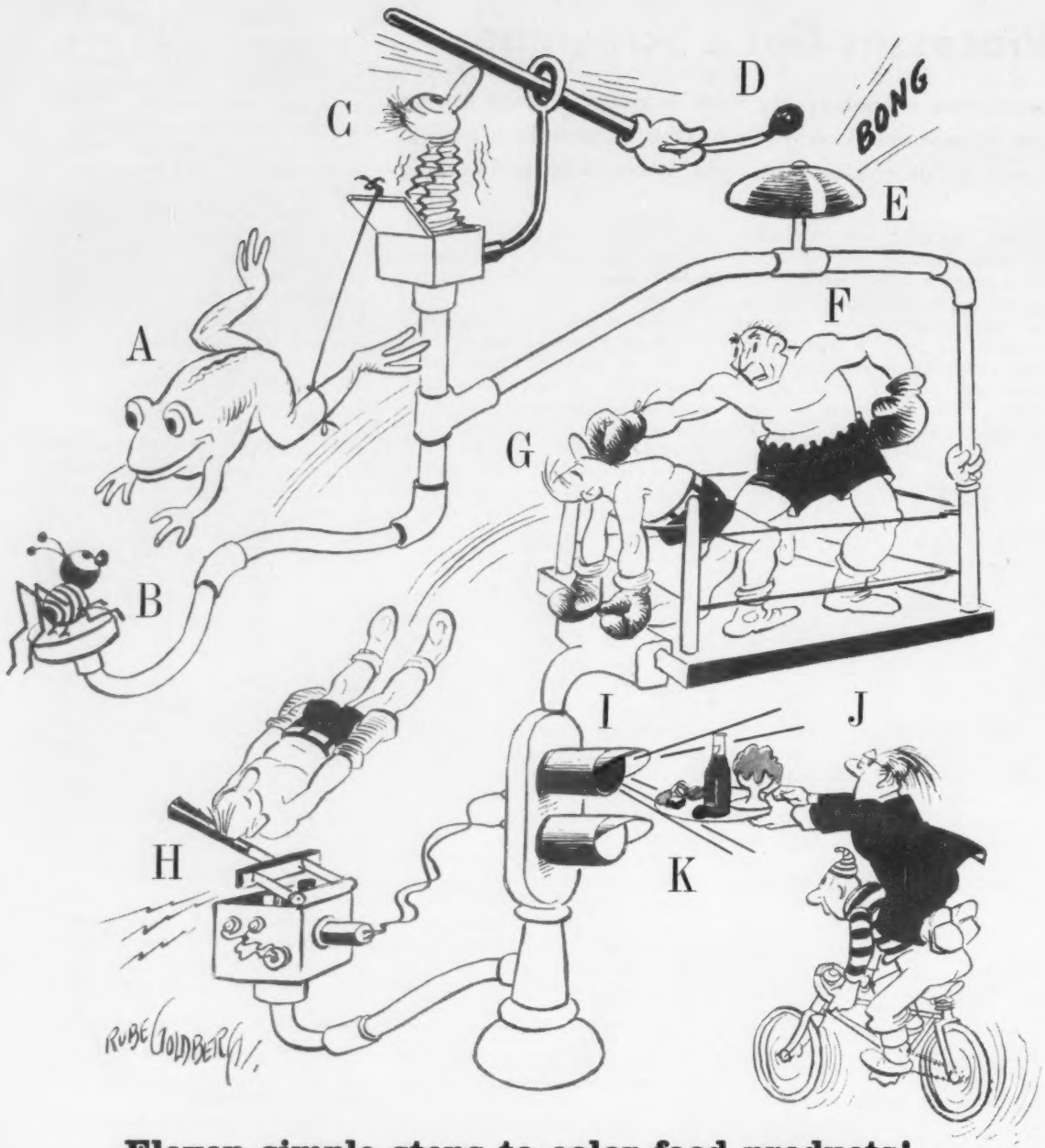
In this two-story and basement plant, 1st floor areas are devoted to processing milk, ice cream, creams and skim milk products; case washing; cottage cheese packaging; milk cooler; hardening room; warehouse; receiving dock; inside loading-dock platform; and outside platform.

Cottage cheese is manufactured on the second floor, in an area with walled-in cold-wall storage tanks that are I-beam-supported on the roof for construction economy. Tanks are coated with 4-in. insulation, and refrigeration piping is kept outside of the plant.

Utilities are isolated in the basement.

The latter include a master electrical control panel (Allen-Bradley); 25-ton Freon compressors for milk cooling; rest, locker, and shower rooms; five Vilter compressors (one 55 and four 40 tons) for cooling storage tanks (2nd-floor), ice cream freezers, hardening room (King sharp-freeze system), and sweet water tank to chill plate coolers and processing vats.

Adjacent to the new plant is a 10x50-ft. road-level truck scale (50-ton capacity), and a housed cabinet-dial Printomatic weigher (Fairbanks, Morse). —*End*




## Eleven simple steps to color food products!

(A) Frog leaps for bug (B) jack-in-the-box (C) is released causing hand (D) to ring bell (E) which starts prize fight (F). Fighter (G) is knocked out of ring, hitting electric switch (H) which turns on stop light (I) food expert (J) holds dish of food (K) in front of light and food is processed in desired color.

*Or, you can do it the easy way, with colors from H. Kohnstamm & Company. They're easy to work with, effective in your product and most helpful in building your rolls of satisfied customers.*

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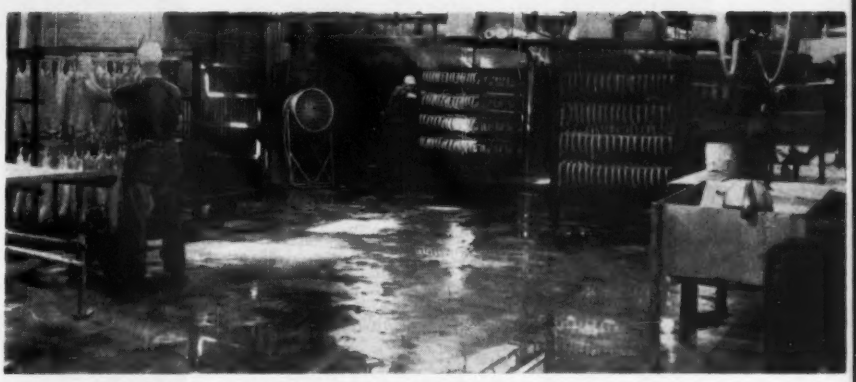
# Work-Floor That Can 'Take It'

**Michigan company nearly concluded that breakdowns of its plant floor surfaces were as sure as death and taxes. But then it found a covering that stands the gaff**



**DESPITE CONSTANT BEATING** over several years—by water, brine, fats, and cleaning solutions, plus rough traffic of heavy hand trucks and racks—flooring in Peet plant's sausage kitchen is still smooth and unbroken. Tough ½-in. layer of special surfacing turned the trick.

FIVE SUCCESSFUL installations of a non-skid, wear-resistant flooring material over 16,000 sq.ft of plant trouble spots have demonstrated to Peet Packing Co., Chesaning, Mich., that it has the answer to work-floor problems that have long plagued meat plants.

Until this packer "discovered" Monile—a sturdy, impact-and-chemical resistant, poured-in-place material—the plant's floor surfaces kept disintegrating under the corrosive action of water, animal fats, brine, and other process liquids. These eroded areas further created safety hazards and cleaning difficulties.

States Secretary-Treasurer Douglas Peet: Such floor troubles chronically hobbled production efficiency in our several plants. At the Chesaning facility, deterioration of mortar joints in the brick flooring had resulted in heaving. This made it periodically necessary to take up and replace sections of the floors.

Further, fatty acids and alkaline cleaning compounds leaked through these joints and eroded the concrete support beams. The fluids were also seeping down on our operations in the basement below.

Rough, uneven floors are specifically to be blamed when food products are lost by being shaken off in-plant trucks. This particularly was anathema to Chief Engineer Dorr Parshall. He also felt that accidents caused in the strain of pushing heavy trucks over such floors could be eliminated.

New impetus went into the search. And the solution was the application, in '57, of Monile (product of The Master Mechanics Co., Cleveland). This material's liquid component is an aqueous suspension of a synthetic resin, and the composite is a carefully graded mix of hydraulic cement silica and silicates.

Initially, the material was laid over the 2,800 sq. ft. of the beef kill-room where other surfaces had failed. A 2½-in. layer went directly over the old brick flooring, following existing contours. After this first success came applications in the lard rendering room, sausage kitchen, cooking room, and ham-molding room, where condition of floors made it necessary to remove the old brick.

## Step-by-Step Closeup

The work was scheduled, so far as possible, over weekends to reduce interference with production. The crew usually got started Thursday evening. First, the brick flooring and any unserviceable portions of concrete sub-floor were removed. Then after 4 in. or more of concrete were poured to form a base, the Monile was mixed and applied.

Briefly, the job is similar to laying concrete—pouring, straight-edging, floating, and troweling. At Peet's, most poured areas were covered with polyethylene film and allowed to set from 30 to 90 min. before the troweling. The work was usually completed by Saturday night, except for the curbing, which was installed Sunday morning. Traffic was permitted on the floor Monday.

Coved bases were installed to facilitate cleanliness and good drainage. They direct the flow of water and cleaning solutions onto the slab, preventing any seepage around the perimeter. Dictating this precaution was the fact that the floors are hosed down with steam, water, and alkaline-type cleaner after every shift.

The liquids and powder ingredients of the new covering were first mixed with a special trap-rock aggregate—to assure high strength and low shrinkage (no carbonates in the rock). The mixture cured rapidly, forming a dense man-made stone having unusual strength and high resistance to acids, alkalis, and grease. Floor deterioration and leakage have been halted.

High bonding property of the material—termed 40 times that of concrete—holds the new surfacing tight to the brick flooring of the beef kill-room and to the concrete floorings elsewhere. Maker states that the material can be applied just as readily to wood floors.

Peet's hand trucks now roll smoothly over the new monolithic surfacing. There are no cracks or crevices. Thus, there is the added sanitary advantage that no dirt is trapped.

The outlay for Peet's floor resurfacing—already extended to the packer's Bay City plant and specified for the Grand Rapids facility—has averaged only $1.67 a sq. ft., according to Parshall. This includes charges (40-50¢ a sq. ft.) for tearing out and restoring the old sub-floors.

Peet's floors were laid by Endurance Floors Co., Detroit Monile distributor, which has specialized in the installations. It is pointed out, however, that anyone thoroughly experienced in laying concrete can apply the material.

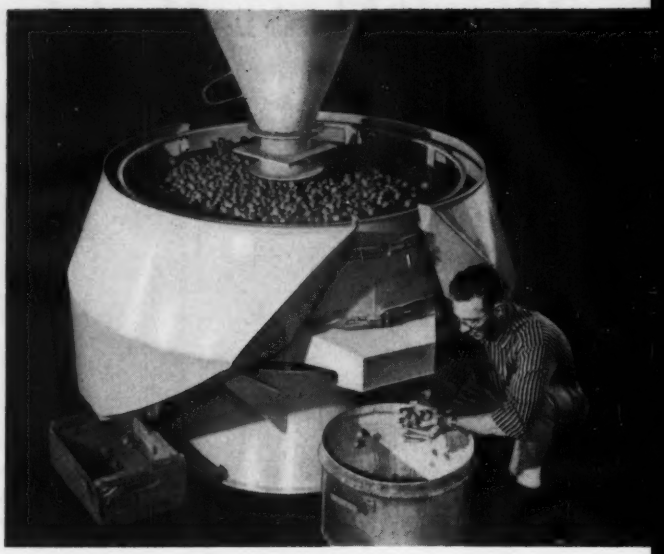


CIRCLE 65 ON READER SERVICE CARD →

**Fred Wheelwright,**
**Manager, Industrial Sales:**

"Two kinds of difficulties arise in the selection of process equipment. The *first* consideration, process efficiency, gives us no difficulty at De Laval. Well-documented performance specifications are reinforced with thorough pilot plant trials at De Laval laboratories when necessary. Each piece of De Laval process equipment is *known* to be capable of doing its job at time of sale.

"The *second* is the joint consideration of tight space availability, scarce manpower and budget. Our success, too, in meeting the needs of space and manpower economy – and budget – is borne out by many thousands of installations. It reflects a performance bonus from the design ingenuity of equipment just *naturally* built to perform with a maximum economy of space and manpower. Three examples are shown here."



**For further information, write to De Laval.**

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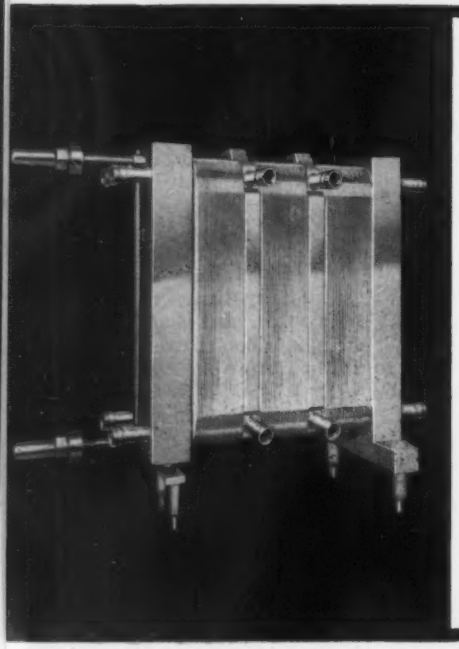
201 E. Millbrae Avenue, Millbrae, California

# THREE DIFFICULT MET BY



## Orange juice pasteurizer squeezes BTU's to the limit

**Problem:** A 55° Brix concentrated orange juice required heating to 190°F. for pasteurization followed by cooling to 35°F. The processing unit was required to be non-affected by the citrus juice, inherently clean and easy to service, in addition to providing high heat economy.

**Solution:** A small 3-section De Laval Plate Heat Exchanger. Syrup is: (1) brought from 70°F. to 154°F. by regeneration; (2) heated from 154°F. to 190°F. using vacuum steam at 200°F.; (3) cooled from 190°F. to 106°F. by regeneration; (4) then chilled to 35°F. by 24°F. brine.

High-efficiency transfer is typified by the 10-11°F. differential in the heating and cooling sections. Solid stainless steel plates proved immune to the corrosiveness of the citrus juice and at the same time provided a highly sanitary heat exchange surface. Plates are easily cleaned in place by back-flushing, yet every inch of transfer surface is quickly and easily accessible for visual inspection.

No other heat exchanger offers comparable space economy and operating efficiency. De Laval Plate Heat Exchangers range in size to fit every process requirement – are easily increased in capacity at any time, by the addition of more plates. Plate Heat Exchangers can be sectioned for multiple exchange processes or for two or more completely independent heat exchange operations.

Full information on this combination of versatility, performance and economy is available at no obligation from De Laval.

## "3-D" grader pays off handsomely in "shell game"

**Problem:** Existing battery of graders were separating in-shell walnuts into 3 standard government grades but producing a down-grading of 18 to 35%. A more efficient classification system that reduced down-grading losses was desired.

**Solution:** A single De Laval Syncro-Matic Separator not only replaced the half-dozen existing graders but reduced down-grading to less than 0.8%! The increased value of the properly graded walnuts payed for the Syncro-Matic in one season.

The unique three-directional motion of the Syncro-Matics accounts for their unusual efficiency. Vertical motion is added to horizontal and gyratory motion to provide *maximum* exposure of products to grading screens. For example, a 6-ton lot of walnuts having a feed distribution of 65% "large," 14% "medium" and 21% "babies," was graded by a Syncro-Matic at the rate of 10,000 lbs./hr. with the following efficiencies:

Large 99%, Medium 96%,
Babies 100%

Single deck, double deck and triple-deck Syncro-Matics are available in regular and stainless steel, adaptable to any type of screen or bolting cloth. Put this "whirlwind" of classifying efficiency to work in your plant if you need higher throughput, maximum separation efficiency – more space for other operations – or all three. For further details, drop us a line.

# PRODUCTION REQUIREMENTS DE LAVAL PROCESS EQUIPMENT

CENTRIFUGES • PLATE HEAT EXCHANGERS • VIBRATING SCREENS • COMPLETE PROCESSES

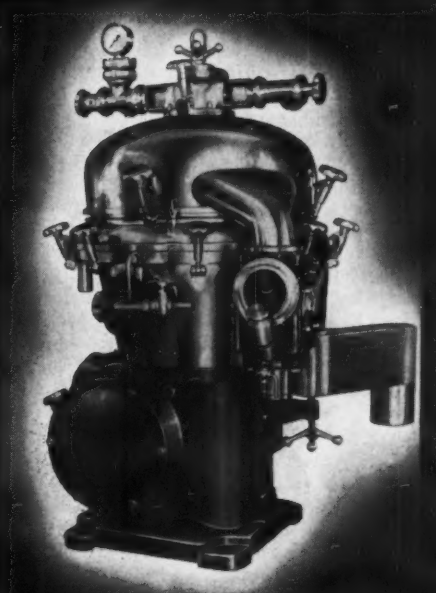
## Centrifugals clean coffee concentrate as filters fail on fines

**Problem:** Filters used to remove undesirable "fines" from coffee concentrates were slowing production due to screen clogging and the need for frequent cleaning. Needed was a *steady* flow of clarified concentrate to boost both production and quality.

**Solution:** The bulky and troublesome filter was replaced by a De Laval Self-Cleaning Centrifuge. The immediate result was a trouble-free continuous source of clear coffee concentrate at the push of the "start" button. Constant concern over clogging and cleaning was eliminated, giving way to automatic centrifugal operation. An extra benefit was the removal of minute oil particles from the concentrate, thus eliminating a tendency of the dried product to "lump" in the package.

The general problem of fines removal is the particular concern of three different De Laval Centrifuges. The type and quantity of fines and the capacity requirements influence selection of the right model for optimum operating economy. In this selection, De Laval's unmatched experience in centrifuge design and application can be of concrete help. Special problems are often resolved in De Laval's pilot plant to insure that you will be delivered the most efficient and economical centrifuge available.

You are under no obligation when you call on De Laval for practical assistance on any centrifugal separation problem. Just drop us a line and let us know where to call.



US RUBBER PACKING

# UPTIME... how much is it worth to you?

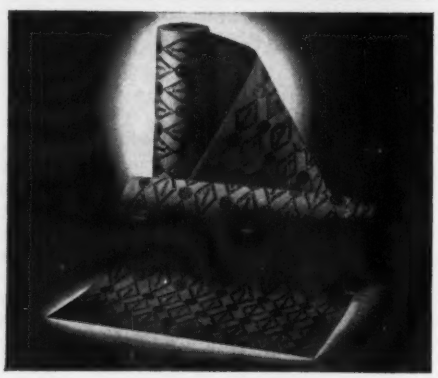
These days, everyone talks about *downtime costs*. Few consider how much *uptime is worth*—the great majority of time when production runs smoothly. How much is uptime worth to *you*, each hour? $100–$200–$300?

And how much are you willing to spend each hour for a packing that will help keep your pumps and flow lines maintenance free? 1¢–2¢–5¢?

That's the kind of money involved when you use a packing like U. S. Rainbow®—first in red sheet packing. Each extra hour of production uptime means hundreds of dollars in production, yet those same extra hours of packing uptime can be had for just pennies... the difference in cost between a quality packing like U. S. Rainbow and ordinary packings.

Rainbow is designed to pack flanges or other parallel surfaces against hot or cold water, air, saturated steam (up to 150 lbs.) and many other hydraulic conditions—and to pack them for longer hours of *uptime*.

**When you think of rubber, think of your "U. S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and the finest quality industrial rubber products.**

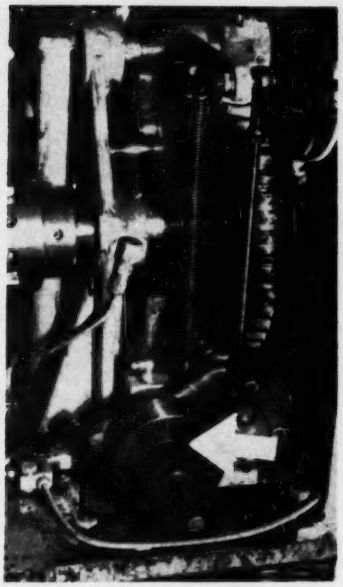


Mechanical Goods Division

**United States Rubber**

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.



## Packaging Rate Doubled With Overriding Clutch

When operating our frozen-food carton wrapper at speeds of 150-175 per min., mechanical paper feed, or make-up, didn't always work right. In fact, ratchet and pawl device controlling feed wasn't accurate enough at these speeds. As a result, wrappers didn't register properly on cartons.

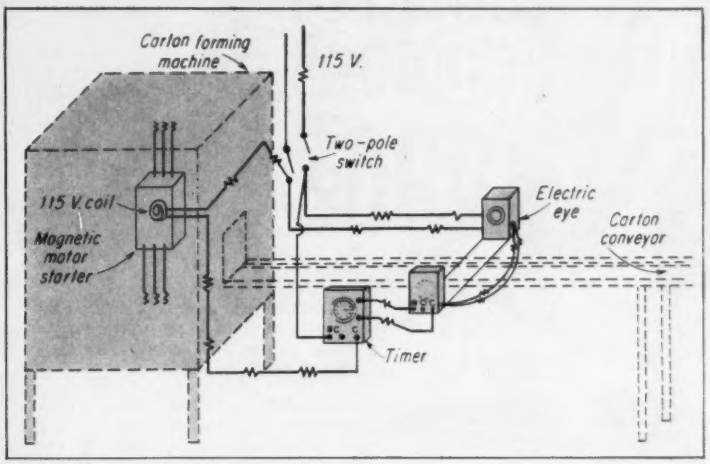
To overcome this, we replaced the device with an overriding clutch (arrow), pirated from another wrapper made by the same company. This required two new bushings and a slight change in the drive-arm holding the connecting-rod. Unit now operates satisfactorily at speeds up to 300 per min.—*Pat Parker, Night Foreman, Patterson Frozen Foods Co., Patterson, Calif.*

**Send FOOD ENGINEERING Your Ideas**

**We'll pay $5 to $15 (sometimes even more) for each item used.**

**Just send us the facts about your idea and its application. And include a sketch or snapshot to show how it works. We'll do the finished writing and drawing for you.**

**Send your idea today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.**



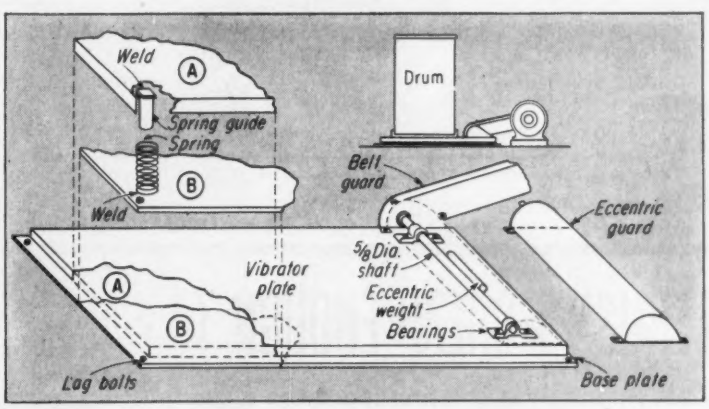

## 'Eye' Trouble Solved

For some time we have used electric eyes to operate our carton forming machines. However, each time a carton broke the beam, the power supply to the machine was momentarily cut-off, thus causing the machine to operate unevenly.

To obviate this, we used a time delay switch in sequence with the eye (sketch) and connected it to the normally open circuit. Now, when beam is broken, it closes circuit and starts timer. It operates only while the beam is broken—then snaps back to original position.

But, when line is jammed with cartons and beam broken for period of time set on timer, it then opens circuit and machine is stopped until beam is once again clear. It then automatically starts the machine.

This system permits one operator to attend several machines, achieves smooth operation and reduces unnecessary wear on the machine.—*Edgar R. Woodman, engineer, Snow Flake Canning Co., Corinna, Me.*




## Dry Milk Packer

Because of its light-weight and bulk, milk powder must be compacted in drums to attain a desired weight of 250 lb. We now accomplish this quickly and efficiently with a vibrator that we designed and built.

It comprises vibrator plate (A) supported by four steel springs on a base plate (B). Plates are fabricated of ¼-in. steel. Springs guides, welded to bottom and each corner of vibrator plate slip inside springs and hold them in position (sketch) above base plate, which is bolted to concrete floor.

Vibrator mechanism is composed of a ⅝-in. dia. shaft to which is welded an 8-in. length of the same

# Grandma could get away with it!

Grandma's recipes were a pinch of this and a dibby-dab of that.

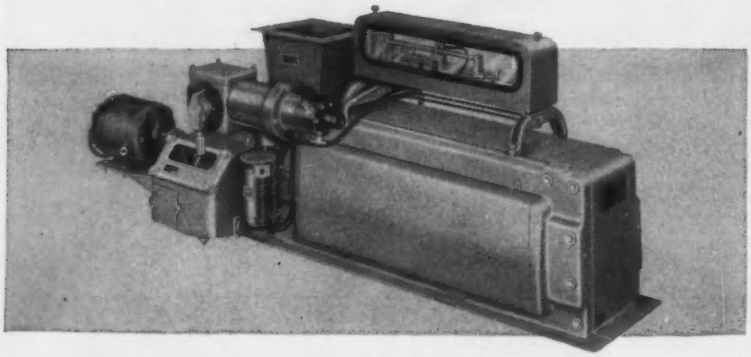
That was fine for Grandma. But it won't work in process blending. Here, you need precise control, minute-to-minute accuracy, exact formulations.

And you get just this and more with W&T's Merchen Scale Feeders and Meters. They control or measure feed rates by weight. There's no guess work. You get exactly what you set the equipment for . . . yields are known; quality is controlled.

You can feed any free-flowing solid in batch or continuous blending operations . . . as little as 3 lbs. per minute; as much as 3000.

And you do it with W&T's rugged, compact Merchen equipment—built for performance . . . built to give you profit-making control . . . built to take the "Grandma" out of your process blending.

*Interested? Write Dept. M-49.37.*



WALLACE & TIERNAN INCORPORATED
25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

CIRCLE 226 ON READER SERVICE CARD

# WATER ISN'T CHEAP ENOUGH TO WASTE

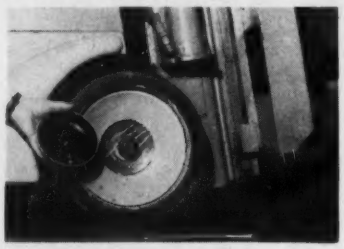
W&T controlled chlorination saves water and lowers treatment costs. You get maximum water value and use...even reuse.

*Write for details on the new V-notch chlorinators: address Dept. S-137.37*

WALLACE & TIERNAN INCORPORATED
25 MAIN STREET, BELLEVILLE 9, NEW JERSEY


## *Practical Ideas*

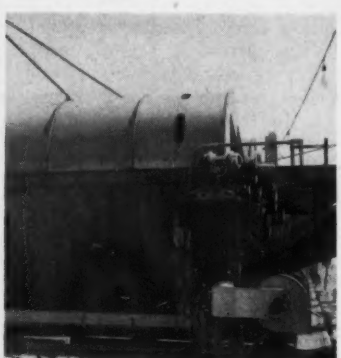
stock. This simple eccentric, set in two self-aligning bearings bolted to the vibrator plate, is driven at 1725 rpm. by a ½-hp. motor.—*Rudy Schweiss, Maintenance Engineer, Spencer Milk Products, Spencer, Wis.*



### Lift-Truck Warning Bell

We haven't had a lift-truck-pedestrian accident in the 2 yr. since we installed the warning device (photo). It is made of a gong (like that of a telephone or fire bell (fastened to the truck's wheel, and rings continuously when the truck is in motion.

Clapper action is achieved by a ¾-in. steel ball, which strikes against a ¼-in. steel vane welded to inner periphery of gong, as wheel turns. Cost is under $5.—*H. W. Lay & Co., Inc., Atlanta, Ga.*

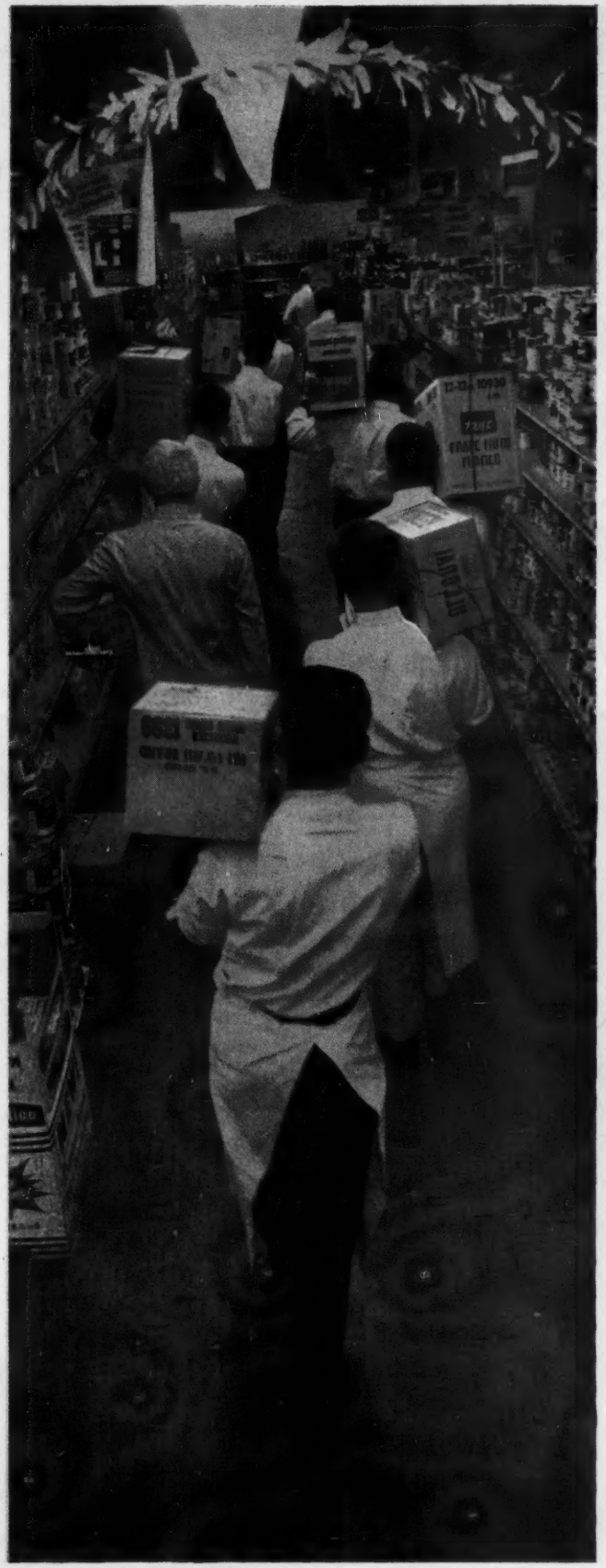


### Viner Changes Bring Gains

We modified the design of our pea viners (photo), installed shaker-cleaners and washers at the viner-station and achieved the following gains:

1. Reduced labor by 30%.
2. Upped yield by 10%.
3. Slashed maintenance costs.
4. Removed 98% or more trash from peas.

To accomplish this, we removed the viners' two conventional draper belts and replaced them with veneer board sides. These form chutes to a central conveyor belt, installed at



# LONGER SHELF LIFE FOR A DOZEN and more PRODUCTS WITH SORBISTAT®-K

■ Protection of a wide variety of foods against mold and yeast spoilage is now easier than ever. SORBISTAT-K (potassium sorbate, Pfizer) is readily soluble in water. You can prepare up to 40% solutions for sprays, dips and metering. Following is a list of only a dozen products out of many where SORBISTAT-K works wonders with shelf life!

- Fruit cocktails
- High moisture cake batter
- Cake fillings and icings
- Fruit pie fillings
- Cheeses
- Fountain fruit syrups
- Chocolate syrups
- Prepared salads
- Pickles
- Jams and jellies (non-standardized)
- Smoked and pickled fish
- Wine

■ *Test the ease of use and effective protection of new* SORBISTAT-K. *Send for a free sample and technical information.*

## NEW IMPROVED SORBISTAT® FOR DRY MIX AND OIL SOLUTION

■ *Pfizer now offers* SORBISTAT *(sorbic acid, Pfizer) in an improved form which has an extremely low moisture content and improved taste characteristics.* This new free-flowing product dissolves readily in oil and fat media or can be mixed easily in dry form with other dry food ingredients.

■ **As a general rule, SORBISTAT-K is the product of choice where water solubility is a factor —SORBISTAT where it is not. Whichever form suits your product best, when you use proper concentrations, you can expect effective inhibition of mold and yeast growth with little or no effect on the taste. Investigate today how you can extend the shelf life of your products with Pfizer SORBISTAT-K or SORBISTAT.**

*Quality Ingredients for the Food Industry for Over a Century*

Pfizer

*Science for the world's well-being*

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San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.;
Dallas, Tex.; Montreal, Canada

# 2-year acid test! Open motor beats enclosed type at its own game

**In a tough acid pump installation,** Dow Chemical's Texas Division experienced no end of motor troubles. It seemed nothing could stand up in that humid, corrosive atmosphere. Reports Dow: "Even with totally enclosed motors, winding failures were frequent." And, they might have added, expensive.

**Then came *Super-Seal* motors** — Allis-Chalmers open-type motors with amazing *Poxeal* insulation. A durable case of epoxy-resin encloses the winding end turns and slot portions of the stator . . . the most complete protection ever developed. Result? The *Super-Seal* motor, after two years of continuous operation in the acid area, is as good as ever. So good, in fact, that Dow has ordered 150 *Super-Seal* motors for a new chemical plant at Freeport, Texas.

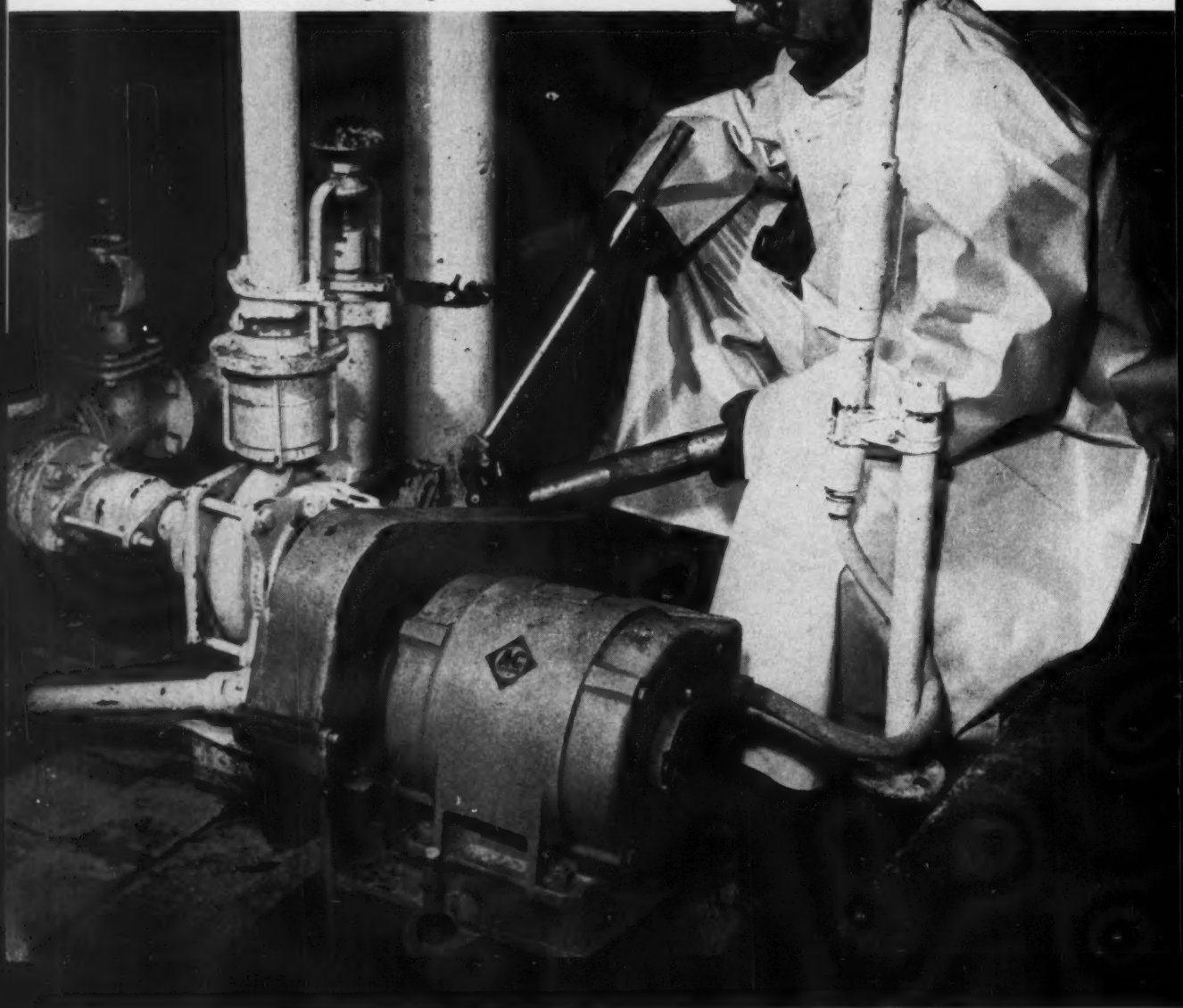
**Isn't it time** to revaluate *your* motor standards? There's a good chance that costly enclosed motors are no longer needed. Contact your A-C representative or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

*Super-Seal* and *Poxeal* are Allis-Chalmers trademarks.

**ALLIS-CHALMERS**

SUPER SEAL

A-1036-GI



**ACID AREA APPLICATION.** Safety equipment and clothing are a "must" for personnel in the acid atmosphere of Dow's chlorine plant at Freeport, Texas. This *Super-Seal* motor came prepared, too — with *Poxeal* insulation guarding the stator.

their apex. Conventional podding mechanism remains unchanged and bulk of vines and pods are discharged from its reel to inclined conveyor, thence to ensilage pit.

Peas drop from the viner reel and are chuted to central conveyor which discharges them into terminal chute. Here, a blower (3-hp., 1700 rpm.) extracts residual fine trash (formerly removed partially by machines and by hand at inspection belts) and blows it into ensilage pit. Peas move on common conveyor to shaker-cleaners.

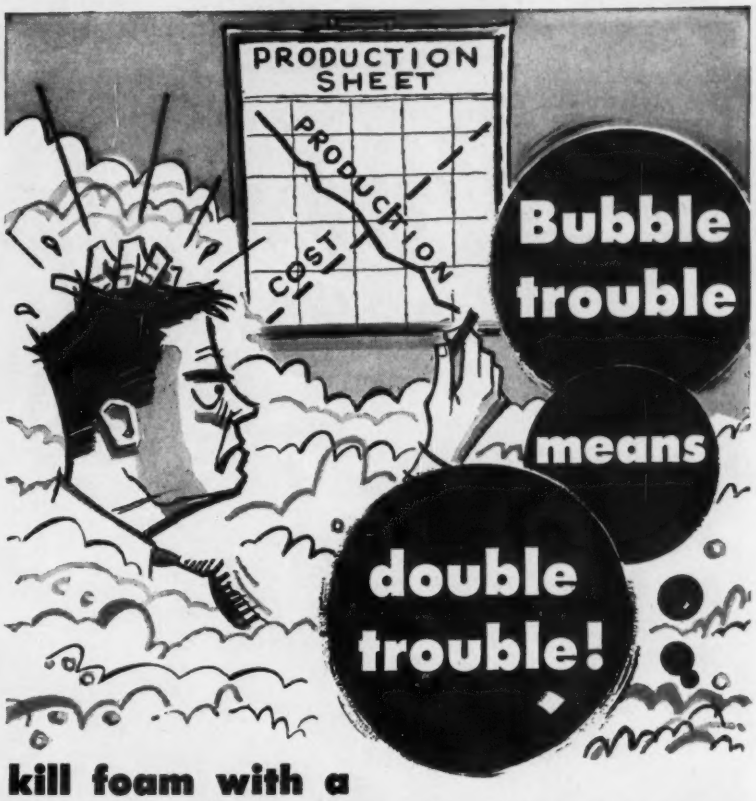
Unpodded peas, heretofore discarded at the plant, are recovered from first shaker, returned to viner for podding. Clean peas in mobile 1200 lb. tanks are fork-truck loaded, six tanks to a truck for transportation to plant.—*Fred Vogt, Production Manager, Patterson Frozen Foods Co., Patterson, Calif.*

### Cart Cuts Labor 1/3

We have a central roller-conveyor system to move orders from warehouse roller-racks to truck loading-dock. Both utilize flat pallets. Heretofore, mixed as well as identical product orders were manually assembled on pallets for the conveyor. This was an efficient system for handling mixed orders—a costly one for identical products.

Our machine shop solved this problem by devising a cart (photo) that cost only $100 but which cuts labor by a third in the handling of identical product orders. It is composed of a mobile hand-jack to which is welded two sections of 9-in. wide roller conveyors—all plant surplus material.

Warehouse roller-racks and the central conveyor are of different heights and the jacking action is utilized to adjust height of cart's bed. It is lowered by a foot-release. —*H. W. Lay & Co., Inc., Atlanta, Ga.*


**kill foam with a Dow Corning SILICONE DEFOAMER**

**Is foam giving you the old "one-two"? One—slowing up your processing . . . two—running up your costs? Fight back hard. Knock out foam fast, with Dow Corning silicone defoamers . . . most efficient foam killers known!**

**1 oz kills foam in:**

**208,333 lb** lobster tank brine

**41,666 lb** soft drink syrup

**20,800 lb** deep fry fats and oils

***FREE SAMPLE!*** **Make your own test. Return coupon below for generous *trial sample* of a Dow Corning SILICONE DEFOAMER. No obligation, of course.**

first in silicones

**Dow Corning CORPORATION**
MIDLAND MICHIGAN

5519

NAME

TITLE

COMPANY

CITY ZONE STATE

My foamer is

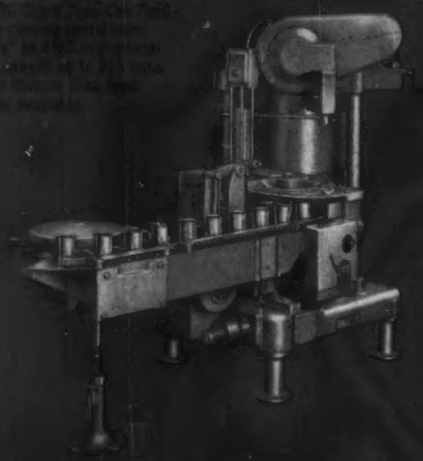
Oil system

Aqueous system

Other

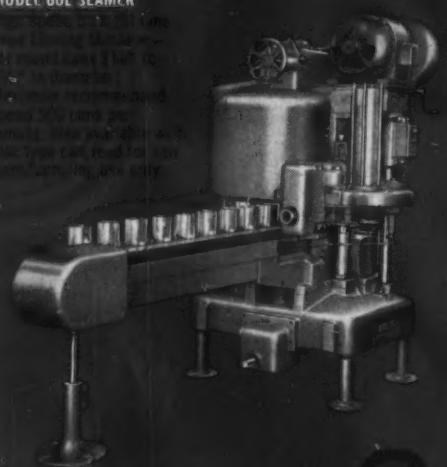
# *Which* ANGELUS CAN CLOSER *for you?*

MODEL 40P-MSLF SEAMER

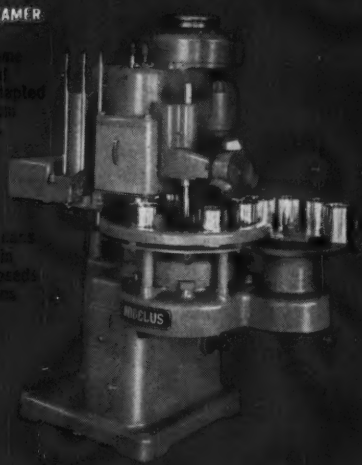


MODEL 50P SEAMER

MODEL 60L SEAMER



MODEL 10P SEAMER



WRITE TODAY

**ANGELUS**

*Sanitary Can Machine Company*

Cable Address "Angelmaco" Western Union Code
4900 Pacific Boulevard • Los Angeles 58, Calif.

# "DOGS DESERVE TAYLOR CONTROLS TOO,"

*says* **ARMOUR**

Armour and Company are proud of the quality of their "Dash" Dog Food, processed in their South St. Paul, Minnesota, plant. And to guard their fine reputation they rely on Taylor automatic controls.

The Taylor FULSCOPE* Controllers (pictured above the retorts) maintain exact processing temperatures. They also provide Armour with a continuous record to prove correct sterilization.

With this system, operator attention time is reduced, the possibility of human error is eliminated, and Armour is sure of a uniform quality product.

To find out how a Taylor control system can help you cut costs and maintain quality, call your Taylor Field Engineer. Or write for **Catalog 500MP** for details of control systems designed specifically for the Meat Packing industry.

Taylor Instrument Companies, Rochester, N. Y., and Toronto, Ontario.

*Reg. U.S. Pat. Off.

*Taylor Instruments* **MEAN ACCURACY FIRST**

CIRCLE 73 ON READER SERVICE CARD

CIRCLE 75 ON READER SERVICE CARD→

529
528

New $36 million, hot strip mill provides quality strip steel, basic raw material for tin plate.

X-ray gage controls help regulate this cold reducing mill which operates at speeds to a mile-a-minute.

New annealing furnaces heat strip steel to obtain optimum uniformity of physical properties.

The temper mill kneads strip steel, then smooths it to meet hardness and surface requirements.

Electronic controls in J&L's No. 3 line coordinate fourteen separate tin plating operations.

X-ray coating-thickness gages assure tin coatings to a precision of ± .0000006 inches.

# Enough tin plate for over 3.5 billion #2 cans

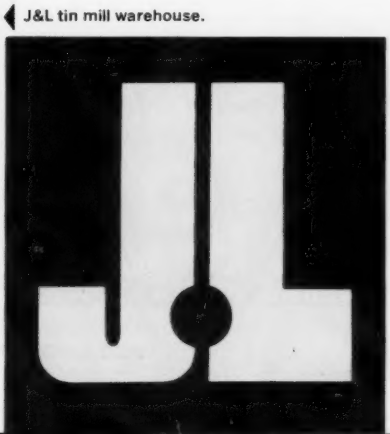
will be produced this year by J&L, who has invested over $42 million to expand and modernize its tin plating facilities since 1947.

Now—with an annual plant capacity of almost 600,000 tons of tin mill products and with almost fifty years experience as a leader in the field—the new J&L is equipped to deliver a product and service which are unsurpassed in the industry.

**Jones & Laughlin Steel Corporation**

PITTSBURGH, PENNSYLVANIA

◀ J&L tin mill warehouse.



Automatic pin-hole detector examines sheet tinplate for pinhole defects in the coating down to .001".

A 15,000-lb. coil leaves the line at Aliquippa, Pa., ready for packaging and shipment to a J&L customer.

Pressure Flow

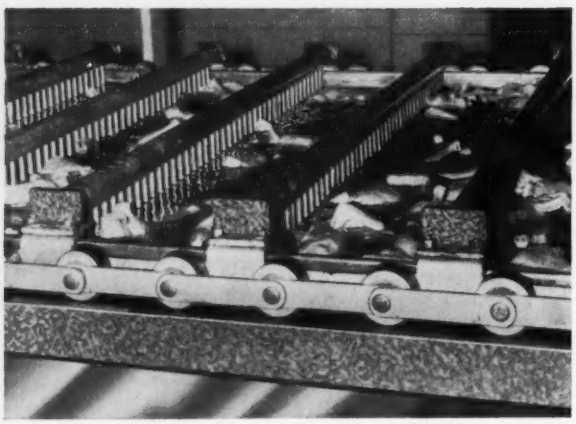
# "C-F-C"*

# $AVE$

MONEY
LABOR
DEPRECIATION COSTS
OPERATING EXPENSE
EQUIPMENT COSTS
PRODUCTION COSTS

***ELIMINATE THIS***

***INSTALL THIS***



**Frick Counter-Flow-Continuous ("C-F-C") Chillers are the answer to the poultry processor's need for a more economical method of controlled chilling of poultry.**

**COUNTER-FLOW CHILLERS** are installed as part of the processing line and furnish properly chilled poultry, ready for weighing, sorting and packing. Thus eliminating the huge costs of labor and equipment formerly required for packing, hauling and unloading by using vats.

**COSTS OF VAT EQUIPMENT,** labor for operating a vat system, maintenance, and replacement costs every three to five years, mean a large capital expenditure. The C-F-C unit, with low maintenance and long life, will replace a vat system with obvious savings within a short period of time.

**NO MORE INDIVIDUAL TANKS TO CLEAN.** A C-F-C unit can be easily cleaned. No hidden or covered areas. The flume is made of stainless steel and all other parts are galvanized. Easily accessible and open for cleaning.

**ONLY C-F-C** using the counter-flow water-cooling method can offer you a chilled product in one operation, delivered out of CLEAR-COLD-CLEAN water after processing.

**ANALYZE YOUR PRESENT COSTS** and that of a C-F-C, and make your own comparison. Write today telling us the capacity of your plant and let us show you how C-F-C can improve your operations and continue to save . . . save . . . save.

DEPENDABLE REFRIGERATION SINCE 1882
**FRICK CO.**
WAYNESBORO, PENNA., U.S.A.

* Counter-Flow-Continuous PATENT APPLIED FOR

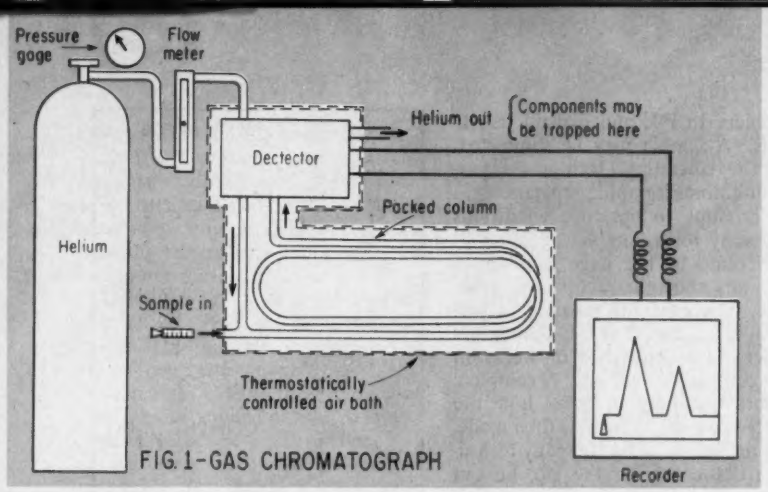


FIG. 1-GAS CHROMATOGRAPH

**PRODUCT SAMPLE** is separated into components in temperature-controlled packed column. Then, these are measured and results recorded.

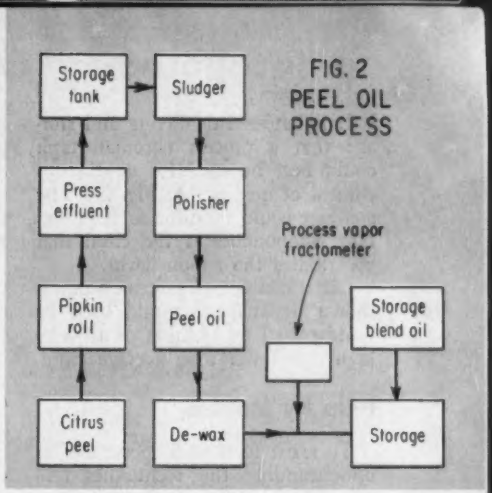


FIG. 2 PEEL OIL PROCESS

**IN-LINE GC** control results in more uniform flavored product.

# GAS CHROMATOGRAPHY

## Striking New Guide to Better Foods

**Extreme sensitivity of technique gives food processors a new tool for pinpointing and controlling minor components that play such important roles in acceptibility**

IN VERY SHORT ORDER, the new technique of gas chromatography has proved of prime value to the food industry.

**▶ Its ability to detect and measure components at very low concentrations has given flavor researchers and compounders a means of analysis and control not previously available.**

**▶ It is being successfully used by essential oil and flavor manufacturers to check raw materials for minor impurities, to trace reactions during processing, and to insure presence of desired quantities of important minor components.**

**▶ Other processors are finding GC an indespensable tool in product development and in the production of uniformly flavored items.**

**ARTHUR V. GEMMILL**
Senior Associate Editor, "Food Engineering"

This report first covers equipment operation and makers' services. Then, in individual sections (titles below), specific applications and new units are detailed.

### How Equipment Operates

In a gas (or vapor phase) chromatography a sample of product to be analyzed is introduced into a gas carrier stream (usually helium) that flows continuously, through a heated tube packed with a suitable partitioning agent. (Fig. 1).

Agent comprises inert granules coated with up to 30% high boiling liquid. By proper selection of this liquid, sample may be separated into fractions consisting of pure compounds. Concentration of each component is measured as the separated fractions pass a thermal-conductivity detector element.

Recently introduced units employ, instead of packed columns, long stainless capillary tubes coated with oil. These are capable of handling fantastically small samples, and greatly speeding analyses.

The process chromatograph automatically withdraws sample from a continuous stream and analyzes it. Unit then switches the appropriate attenuators in detector circuit so that concentration of each component can be recorded directly on a chart. A possible application is in production of citrus peel oils.

These are recovered by cold processing, which results in an oil-water emulsion. This is passed through a sludger and polisher (both centrifugals) which separate the oil from water. Former is usually stored at low temperature for several days to allow waxy materials to settle out, then oil is removed and stored.

**COVER PHOTO:** Technician at General Foods' new Research Center studies tracing from gas chromatograph (Perkin-Elmer) for possible variation in product taste. Unit indicates — even before taste-panel tests — presence of off-flavors and odors.

Sharpens Control of Flavor Components
GC Strides in Food Research
Targets Gourmet Qualities
Problems 'Flavor Prints' Can Solve
Coming — An Analytical Revolution

It is between de-waxing and storage that a process chromatograph could best be used for continuous control of quality (see Fig. 2). The analyzer could monitor such important components as the citral that contributes the lemon flavor.

Citral content of processed oil, as shown by analyzer, could then be standardized by addition of oil with higher or lower than average citral.

### Help by Makers

To assist food plant personnel in understanding the techniques and principles of gas chromatography, most instrument manufacturers provide aid programs.

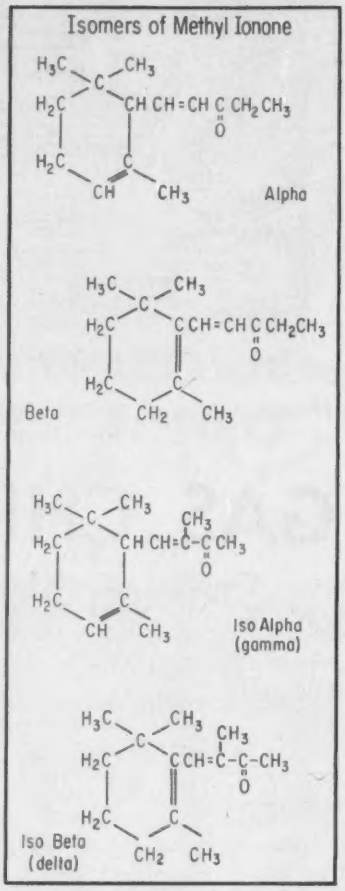
Typical is the accommodation offered by Perkin-Elmer Co., Norwalk, Conn. At its plant a complete analytical laboratory is maintained, staffed with technicians trained in spectroscopy, chromatography, etc.

A common approach is for the interested company to present its problem to P-E and explain its objects. A sample may be submitted. At the laboratory, technicians perform chromatographic separations in an attempt to optimize conditions necessary for a complete analysis.

Because of the large number of columns and other accessories available, it is generally possible to perform rapid studies at P-E that would otherwise require days or weeks in the company's own lab. A complete report, outlining in detail how the analysis was performed, is then made.

Further, should a company technician desire to visit the lab, he can obtain instruction in operation of the equipment and familiarize himself with problems and procedures of GC as applied to the food industry.

To broaden its knowledge of food problems, P-E held an all-day symposium last year with leading researchers of the food industry. And information thus developed has been most significant in the chromatographic strides.




**CONTROL** of these isomers by GC enables more uniform flavor production.

# Sharpens Control of Flavor Components

**EDWARD C. FEARNS**

**Manager Analytical Department, Union Beach, N. J., plant, International Flavors & Fragrances Inc.**

"POWERFUL MECHANICS" for flavor investigation are afforded by the gas chromatograph.

It has also been a friend to the benighted production chemist who must answer the customer's complaint that Lot B of a given flavor differs from Lot A, although both of them were presumably compounded to the same formula. With GC he can separate and identify the unwanted components that cause the difference.

In addition, it has greatly assisted the synthetic organic chemist who is attempting to prepare new materials that will provide totally different flavor effects.

Through gas chromatography—particularly using the large-bore units coupled with various spectrophotometric instruments, including the mass spectrometer*—he is able, in a few weeks or even days, to separate and identify whole families of chemicals that are either part of his raw materials or his final product.

The large-bore unit enables him to separate the product into its components and allows the flavorist to examine them to decide whether or not the major, or some minor constituent gives the desired effect.

Application of this new technique to control of flavors and their components is just beginning to come into its own.

One reason for this is the relative expense of the equipment. A second is that only one analysis can be done at a time on a given instrument. Third difficulty is that GC requires an extensive amount of experimentation for each new determination. The instrument merely draws a set of peaks. Initially, it is up to the chemist to decide what those peaks are and whether or not their heights or areas are truly proportional to concentrations present.

In short, each analysis must be preceded by perhaps 10 or 20 trials to find the correct column material and temperature, flow rate, and other conditions necessary for conducting the analysis.

**▶Once this is done, however, the same analysis may be repeated routinely, yielding much more information than any single chemical determination.**

Compounded flavors are very complex. They may represent a combination of 20, 30, or 50 components, many of which are combinations of a large number of other components.

Resulting chromatogram of such a material is a literal forest of peaks. To identify them, to measure their heights and areas, and compute the relative percentage of each is a monumental task. Small wonder, then, that very little has been done on the quantitative analysis of compound flavors by this technique.

**▶However, GC can be applied to control of such materials in a different way. Thus, two or more successive lots of a given flavor may each be subjected to GC. No complete quantitative analysis would be made, but the general profiles of their chromatograms could be compared.**

It is reasonable to assume that, if the lots are substantially identical, their chromatograms will be similar. Unless column packings and other conditions are identical, however, elution time will not be exactly the same, but the succession of high and low points will be alike. A difference in the general pattern of these peaks is an indication of specific dif-

* Gohlke, *Analytical Chem.*, 31, 535, 1959.

ferences between the successive lots.

At IF&F, we are using this technique to study the product of a complex reaction having a rather large number of components—to be sure we are getting substantially the same end-product each time.

Up to this time, the major application of GC to flavor materials has been in the control of components or, as they are frequently called, the "flavamatics." The profile type control can be applied to the very expensive terpeneless oils. Here, examination of the peaks of a chromatogram representing oxygen compounds in such oils may show that the pattern is completely different from that obtained with a genuine sample, thereby giving some indication of the foreign components.

## Controlling Composition

Previously, the only method of analyzing for a single component has been a bulk-type assay. Thus, a given material might be a mixture of several alcohols, but analysis will be figured in terms of the particular alcohol present. With GC, we can determine relative amounts of each of the individual alcohols that would have been calculated as the principal one.

We are further using GC to: (1) Assay finished products of our fractionation and keep the composition-ratio of these alcohols at the same level, and (2) guide the work of our distillation department.

Many flavor and fragrance components contain several related chemicals all in one class like the alcohols. In compounding them, it would be possible to use pure varieties. To be economically competitive, however, they must be prepared from the type products that have always been available.

Further, components that are mixtures may have better flavor values than pure ones. With GC, a constant ratio of these component constituents can be maintained, thus holding the flavor quality.

We will not try to sell our customers chemically pure compound A when he has always bought one prepared from commercially available products. But we can assure him that we will maintain the various components within narrow bounds.

Among flavor components being controlled by GC are various members of an homologous series. Thus, a given aliphatic alcohol, aldehyde, or ester might contain small amounts of the next higher or next lower member of the series. Chemical assays will not indicate presence of these impurities, whereas GC will show how much of the principal component is present and amount of related compounds.

Mention of the aliphatic aldehydes brings up another application of GC to control of flavor components. Many of the aliphatic aldehides undergo condensation reactions that do not materially change the apparent chemical assay, but definitely reduce the vapor pressure and their aromatic potency. True aldehyde content of such a material is being determined by an internal standard type GC analysis.

Even more difficult than analysis of such closely related materials, are isomers, such as the methyl ionones, used as components of certain artificial berry flavors. There are many possible isomeric methyl ionones, four of which may be present in commercial products (see drawing). Relative proportion of each, particularly the alpha and iso alpha or, gamma, has a great bearing on type of odor or flavor obtained.

Until recently, only empirical gravimetric measurements could determine the amount of any one of the components. We are now using GC to assay the amount of each in ½-¾ hr. per determination.

In many cases it is important that small amounts of impurities be left in a given component, because it is a synergistic combination of the principal component and the impurity that gives that component its characteristic effect on flavor of the finished compound.

## Tough Problems Solved

Not long ago we had a batch of compound whose odor was somewhat weak. After a thorough examination of many of the components it was found by GC that one trace constituent differed in its ortho-para ratio from previously used lots.

This points up the fact that in some cases it is very important that materials not be chemically pure, but that the impurities be kept within careful limits. GC is ideally suited for this type problem. In other cases, impurities contribute to development of off-flavors or odors. Here, GC is a wonderful monitor for either minimizing such impurities or keeping them constant.

Still more difficult than these structural isomers are the various stereo isomers based on cis-trans relationships. Thus, we have a product that contains cis and trans isomers which differ in odor. With GC we are able to prevent any variation in odor of this product by monitoring the cis-trans ratio.

This points up use of GC in the manufacture of flavamatics:

The chemist who is obliged to manufacture a product that will always have the correct odor or the correct taste is literally shooting in the dark. He must adjust the condition of his reaction or his distillation so as to get a maximum quantity of product which the flavorist will find acceptable, frequently without any very strong idea as to what particular chemical he is trying to make.

By GC he is able to separate these components and let the flavorist decide exactly what combination is going to give him the desired effect. Using the large bore unit, he can then trap out and identify these components. Applying his knowledge of synthetic organic chemistry, he can establish the proper conditions of his reaction vessels and of his stills to get the maximum amount of desirable components.

This all leads to the gas chromatography of the future. In many synthetic organic fields the process is now literally being monitored, if not controlled, by process-stream chromatographs.

These devices periodically trap out a portion of the stream being produced, subject it automatically to a GC analysis, and record the results on a bar graph. Operator can examine this graph and note whether or not desired composition of material is forthcoming. If he sees that Component A, for example (which should run between 55 and 58%) is beginning to drop, he can take remedial measures. In some cases the signal from such a device can be connected with suitable pressure, temperature, and other regulating instruments, to do this automatically.

This type apparatus has not yet found use in the manufacture of aromatic chemicals. Reason is the same as that responsible for relatively slow introduction of GC to these industries—the relatively high boiling points of the materials used.

Laboratory chromatographs normally take a sample of 1/50th ml. of liquid, or perhaps 1 ml. of gas. As this is about the smallest sample that can be accurately measured automatically, all process-stream units are based on sampling as gas.

This means that, with existing equipment, the materials must be completely vaporizable at a temperature no higher than 150C. For the higher temperatures distort the metal parts of the valves or decompose the lubricants, thereby contaminating the sample. Except for some of the low boiling esters, very few of the materials used in flavors meet this requirement regarding temperature.

It is entirely possible that the development of less heat-sensitive sampling equipment—or better still, some ingenious method of sampling such a stream—will lead to a solution of this problem. At present, it is not practicable to use plant control vapor-phase chromatographs in our industry.

# GC Strides in Food Research

**L. S. FAGERSON**

**Professor, Department of Food Technology, University of Massachusetts, Amherst**

A KEY ROLE is played by gas chromatography in analytical techniques—as particularly reflected by its use for some 5 yr. by the Department of Food Technology, U. of Mass.

During this period, its application to a wide variety of problems on food analysis has been explored in cooperation with instrument manufacturers, governmental agencies, other universities, and private industry.

One of the most fascinating areas of application is that related to the study of food flavors and flavor differences.

**Odor and taste are the major components of the flavor complex, and for the majority of foodstuffs odor is the most characteristic and the most difficult to measure.**

There are two good reasons for this: (1) The extremely high sensitivity of the olfactory mechanism in man—recognition of compounds at concentration levels of 1 ppm. or less, and (2) the apparent chemical complexity of most food odors.

Most commercially available gas chromatography instruments can achieve separation of volatile mixtures with efficiencies greater than 1,000 theoretical plates. And recent developments in sensing devices make detection at levels on the order of $10^{-12}$ moles possible.

These characteristics provide two attractive possibilities:

1. Identification and quantitation of components of the odor complex on an absolute basis. While absolute analysis is of unquestioned value, there are many applications where this may not be necessary.

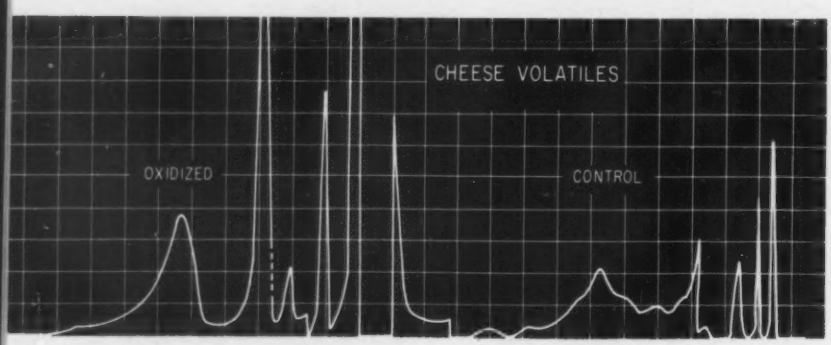
2. Characterization of an odor complex on a relative or comparator basis—that is, the utilization of the chromatogram obtained as a kind of "fingerprint".

## Checks Pesticide Residues

The "comparator" approach is being investigated in connection with several applications. One is concerned with effect of pesticidal treatments on the flavor of fruits and vegetables. Careful taste-panel evaluation is carried out to determine flavor differences.

Panel results are then compared with gas chromatograms to determine whether differences can be correlated with them. Once these correlations are established, flavor differences can then be detected by a rapid, objective instrumental technique. This type of comparator approach would be of particular value in quality control.

As an illustration of this technique, note chromatograms below.




**SENSITIVITY** of GC to off-flavors is illustrated by this graph.

The "oxidized" sample in each case was rather severely treated by exposure to oxygen at 50 deg. C. for 24 hr. to accelerate off-flavor production. Time for complete analysis, which includes sample collection, is 60-90 min. Of this total only 15-30 min. is required for the actual gas chromatography. With improvements in instrumentation and methodology, time can be reduced still further.

As a research tool, gas chromatography is presently being employed on a basic study concerned with isolation and identification of volatile compounds associated with incipient deterioration in foodstuffs.*

## Breakdown Products

Prior to occurrence of obvious breakdown products, perishable foods undergo more subtle changes that are often only detectable as slight alterations in normal odor. Chemical characterization of these changes via gas chromatography and infra-red spectrophotometry should help clarify the biochemical mechanisms involved in the early stages.

Long range objectives of such research may lead to improved methods of *preventing* food deterioration, as well as providing objective methods of quality measurement.

A smaller exploratory study is also under way.** It deals with the possibility of classifying microorganisms of public health significance via their production of volatile materials when grown under standardized conditions. Here, again, the requirement of highly efficient fractionation and sensitive detection makes GC uniquely applicable.

Another area of application in our research program is in the field of food packaging. Here, GC has been applied to a study of the permeabilities of flexible films to oxygen and nitrogen as a function of relative humidity.

A recently instituted study concerns evaluation of flexible packaging films as odor barriers. This is a particularly important consideration in the packaging of such products as cake mixes, dessert powders, etc., which contain volatile flavors.

Since GC is uniquely suited to the analysis of such complex mixtures as essential oils, it is being used to measure transmission rates of such compounds as a means of evaluating packaging materials.

*Study supported by the National Institutes of Health.
**Do.

While instrumental methods are of great value in reducing the time spent on routine analyses, their greatest value often lies in providing information where conventional methods are inadequate. This appears to be particularly true for application of GC to food analysis problems.

*Above article is Contribution No. 1190, Massachusetts Agricultural Experiment Station.*

# Targets Gourmet Qualities

**WILLIAM S. RYDER, JR.**

**Project Leader, Flavor Chemistry Group, Research Center, General Foods Corp., Tarrytown, N. Y.**

TRUE ENOUGH, gas chromatography is still in its infancy in the food industry, as contrasted with other fields which have more fully explored its potentialities.

But certainly, no field can present a greater array of knotty analytical problems applicable to this technique than the food industry, particularly in respect to winning highest gourmet qualities in flavor and aroma.

As a highly efficient fractionation technique it allows one to—

**▶ 1. Isolate a single component and evaluate its flavor and aroma.**

**▶ 2. Partially determine its structure as to functional groups.**

**▶ 3. Totally determine its structure by means of infra-red and mass spectroscopy.**

Gas chromatography thus finds application in: (a) Control of raw materials employed in creation of food flavors and aromas; (b) control of flavor and aroma of finished products; (c) improvement of flavors and aromas for existing products; (d) development of new flavors and aromas for use in both existing and new products; (e) understanding processes —that is, the effect of various unit operations on raw materials and on formulated flavors and aromas; and (f) stabilizing both raw materials and formulated flavors and aromas under various storage conditions.

## Flavor Chemicals Tested

Here at General Foods we perform analyses on many organic chemicals and natural products used in the creation of food flavors and aromas. Also chemicals such as antioxidants and emulsifiers used to impart desirable physical or chemical properties to the product.

Tracings from the gas chromatograph are used to determine purity of the material, also to provide information on the nature of possible off-flavors and odors. These analyses help determine the stability and uniformity of material from one sample to another.

Chemicals used in flavor formulations are evaluated individually for their odor and taste characteristics. With GC, a slight change in the ratio of component peak areas—with or without the appearance of new component peaks in trace amounts—may indicate the presence of off-flavors and odors even before checking by a taste panel.

Since most of these chemicals are produced on a batch-synthesis basis, variation among batches is possible. This problem may become even more serious when changing from laboratory experimental samples to production quantities.

Now for an example of how gas chromatography recently aided in averting a costly error in scaling up a new flavor:

Here, all development work had proceeded smoothly, even though several different batches of one ingredient chemical were used. For production, however, a large batch of the chemical was needed. A last minute taste panel evaluation pointed out an off-flavor and taste in this particular batch.

By means of GC it was then shown that the chemical contained both low and high boiling impurities. And ultimately GC verified the removal of offending components.

Had we not been able to determine the cause of the off-odor and taste we would not have attempted to produce the flavor. Thus, with the aid of GC we avoided a costly delay in getting the product to the market-testing stage.

**Essential Oils.** Analyses are also performed on essential oils used in the creation of food flavors and aromas. Due to complex nature of the oils, their analyses are more difficult and interpretation more involved. Here, the converse of chemical purity holds true. For example, the desirable, yet subtle differences in flavor and aroma character are frequently due to unique combinations of trace components whose removal would be detrimental.

**Compound Flavors.** Our company utilizes flavor formulations comprising organic chemicals and essential oils stabilized and fixed as powders.

Having established, via GC and other analytical methods, both qualitative and quantitative specifications for each ingredient in the liquid flavor, we are able to look for and guard against any changes that might occur as a result of fixation or which might develop during storage of the product. Studies of this type not only aid the flavor group, but also those engaged in packaging research and product development.

## Other Natural Products

Oils, essences, and extracts from natural products often play an important role in the creation of food flavors and aromas. Their analyses by GC are of great interest, since fundamental information is thus provided on the chemical composition of natural flavors and aromas. With this knowledge at our disposal we are in a much better position to duplicate natural flavors and aromas with our synthetic formulas.

Materials of natural origin are also studied critically with an eye toward obtaining new sources of unique flavors and aromas. It is an economic advantage when we can obtain something useful from materials ordinarily lost during processing or through special processing techniques applied to relatively inexpensive raw materials. Considerable attention is given to this specific phase of our operations.

Gas chromatography is, of course, still a new analytical tool, hence many techniques and applications remain to be developed. Several limitations have been recognized as regards flavors and aromas.

The technique is best suited to handling relatively volatile materials, but in food products we recognize the additional flavor contribution from non-volatile materials, such as salts, amino acids, peptides, carbohydrates, and vitamins.

While GC is capable of handling microgram quantities of flavor and aroma components, one is required to process large quantities of natural material in order to get even these small amounts. In obtaining samples for analysis, it is usually necessary to eliminate a large amount of non-volatile material or volatile material of no flavor importance such as ethyl alcohol, methyl alcohol, and acetic acid.

Also, flavor concentrates and fractions derived from natural products

are usually rich in water which, in spite of special techniques, seriously limits our ability to fully resolve the organic components present.

At the Research Center, creative thought and ingenuity are being successfully concentrated on specific methods of sample preparation and introduction, partitioning substrates, and component isolation techniques.

The advent of gas chromatography has by no means eliminated the necessity for other methods of chemical and physical analyses. Chemical tests for functional groups (colormetric methods), infra-red, ultra-violet, and mass spectroscopy are all employed in identifying the chemical components of flavors and aromas separated and isolated GC.

With many materials we have found it extremely helpful to combine column chromatography with gas chromatography whereby the latter is reserved for handling rather distinct solvent eluted fractions obtained from the complex mass of starting material.

There can be no doubt, however, that our gas chromatographs are saving tremendous amounts of time in addition to providing us with qualitative and quantitative information of a nature never before available.

## Problems 'Flavor Prints' Can Solve

**ERNEST E. LOCKHART**

Scientific Director, Coffee Brewing Institute, New York City

AS A PRECISE, simple, and efficient analytical technique, GC has become a potent economical aid in the search for new and previously inaccessible knowledge of coffee flavor and aroma.

Until about 3 yr. ago, research on coffee aroma was at a low ebb.

Such research was so difficult, uncertain, expensive, and unrewarding that few, if any, were willing to assume the risk or to waste the effort, so it seemed. Good analysts were available, as always—but not the analytical techniques.

Gas chromatography is changing all this. With it, the complex that is coffee aroma has yielded a number of its secrets.

About 4 years ago, the Coffee Brewing Institute purchased one of the early Perking-Elmer vapor fractometers, as it was called, and in collaboration with the Southwest Research Institute went to work.

In the beginning it was not easy, because coffee aroma needed some understanding and careful treatment —also coaxing—before it could be induced to let itself be picked apart.

After a while, however, things began to fall into place. And now all but one of the 20 components that have appeared on a chromatogram, prepared according to specific conditions, have been identified.

The way in which aroma develops in different varieties of coffee during roasting has been studied successfully.

The aromatic characteristics of many commercial blends, as defined by chromatograms, have been analyzed. Similarly the aroma of several instant coffees has been fractionated for study.

But what is most important to the consumer, a study of aroma transferred from grounds to beverage has been carried to a useful end. Some knowledge of the stability of aroma, both in regular and in instant coffee, has been obtained.

Among the questions now faced with new confidence that answers are obtainable are:

Can off or undesirable foreign odors in green beans be detected and identified as a purchasing control?

Can blending of varieties be accomplished more surely and precisely than hitherto?

Can coffees be identified according to type, origin, and age?

Can roasting conditions be more precisely defined? Can these techniques or modifications of equipment and processes be evaluated?

Can losses during grinding be measured and controlled? Can equipment and processes used in the manufacture of instant coffee be evaluated? Can equipment used for beverage preparation be evaluated and improved?

Can stability of regular and instant coffee with respect to packaging, storage, and changes in beverage after preparation, be studied?

Can synthetic coffee aroma be developed? Can technique be used to measure and control quality?

The resolving of all these questions, and the many still unposed, is now within the range of reasonable probability—using gas chromatography. But without it, the probabilities would be low. Briefly, then, gas chromatography makes possible what only a few years ago was impossible.

## Coming—An Analytical Revolution

**DONALD A. M. MACKAY**

Associate Research Director, Evans Research & Development Corp., New York City

GREAT as has been the impact of gas chromatography on many scientific fields, it is sad to consider how little use has yet been made of this vastly rewarding technique in the food industry.

True, many forward-looking companies have obtained instruments and trained their staff in research applications. But even so, very few have brought the machines out of the research and analytical lab and into the plant.

The last few months, however, has seen a new impetus in GC that could easily revolutionize this picture overnight. Advances made possible by new instrumentation offer as big an advantage over present equipment as GC itself offered when it first appeared.

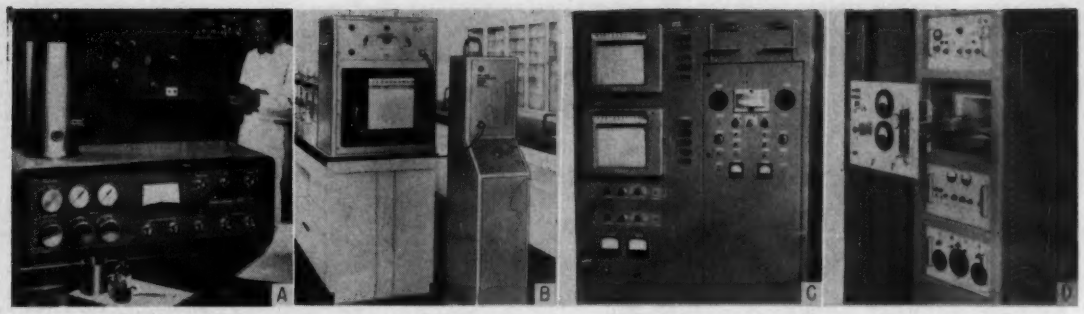
A gas chromatograph consists of only two main parts—a column that separates a mixture, and a detector that tells what individual components have come off the end of the column. Fantastic advances have been made in both these parts by introduction of—

1. **Capillary columns.** Usually 100 ft. of 0.01-in. I.D. stainless tubing, these are coated with a film of oil to offer vastly improved performance over packed columns. In them, one continuous capillary replaces what might be considered a bundle of capillaries formed by the packing.

2. **Ionization detectors.** These are probably up to a million times as sensitive as the majority of thermal conductivity cells in current use.

It should be emphasized, however, that although introduction of these two new devices should bring GC analysis into fields untouched by existing instrumentation, the new equipment does not obsolete the existing packed-column and thermal-detector method. Rather, the two systems complement each other to provide a more powerful equipment for analysis of a wide variety of compounds, and for solution of a far broader range of problems.

Even though considered as merely an extension of the present method,



**FOUR EXAMPLES** of new capillary tube units: (A) Perkin-Elmer; (B) Pye Argon; (C) Barber-Colman; (D) Aminco.

the new units hold out enormous promise for food processors, and certainly are capable of revolutionizing present control practices.

Capillary columns, apart from being better separating devices, are free from troubles due to settling of packing, channeling, decomposition due to the packing itself, and they are much smaller, hence more easily heated and temperature controlled.

Credit for this development goes to Perkin-Elmer Corp., although several other companies are currently offering capillary column units. Delivery times are some months ahead for all of them,

P-E says its capillary column unit is normally capable of producing chromatograms with at least five times better resolution than packed columns—and in less time. If time is a critical factor, it can provide resolution equal to that of packed columns in a tenth of normal time."

But don't think you can successfully replace your present packed column with a capillary one—you can't!

Amounts handled by the latter are so small that sample splitters are needed that reject over 99% of the injected sample. Also, highly sensitive small-volume detectors are needed to pick up components eluted from the column. Ionization detectors serve wonderfully here.

Although necessary for use with capillary columns, these detectors can be used with ordinary packed columns and still reap the advantages of their fantastic sensitivity (1 part or less in 10 billions). Values as low as $10^{-14}$ moles are being spoken of as close to realization.

Another unit is the Pye Argon Chromatograph, imported from England by the Jarrell-Ash Co. It uses a beta-ray ionization detector and argon carrier gas, as developed by J. E. Lovelock, London. The company says that ordinary packed columns give much better results with ionization detectors, since much smaller amounts are needed for detection. A better story is obtained from 0.025 $\mu$l. than the 0.02 ml. often used with thermal cells.

In flavor research, where amounts available are fantastically small, this is a tremendous gain. In our work we have been able to use vapors immediately above a foodstuff and get chromatograms without need for intermediate steps of isolation and concentration. This new detector barely responds to water, carbon dioxide, and other inorganic substances.

**Naturally, direct sampling of vapors means fast results—with perhaps as little as 5 min. elapsing from taking the sample into syringe to obtaining the answer. Here's where product control starts to become a reality. Speedy, reliable, nondestructive, the new equipment gets into the realm of analyzing the same sample of air that might have been taken into the nose for sensory evaluation.**

The Barber-Colman Co., too, has put out an ionization detector, packed column combination. Unlike the Pye machine, which emphasizes simplicity of operation and column changing in 15 sec., the B-C is a massive affair. It has provision for flash heating of injected samples, and collection of separated fractions. The Pye neglects these, the maker saying amounts are far too small to collect in any case.

The American Instrument Co. (Aminco) also has a newly designed instrument for extremely sensitive detectors. This is a wide-range unit featuring high throughput with a dual-column system—while one is running, other is being purged. Same or different columns can be used.

A new type, very sensitive thermistor detector is used for most problems, with provision for a radio frequency detector to be connected in series when utmost sensitivity is required, or when looking for trace impurities missed by the thermistors. The R.F. detector works on a different principle from the argon beta-ray ionization detector, but is probably in about the same sensitivity range. (This was developed by R. L. Bowman and A. Karmen, National Institute of Health, Bethesda, Md.)

In addition to a beta-ray detector, P-E is also featuring another type of device, called the Flame Ionization Detector. It uses a hydrogen flame to cause the ionization of the eluted compounds (which is basically what the beta-ray unit does). Company's new capillary column unit allows either ionization detector to be used.

As P-E points out, both detectors have high sensitivity, low sample volume, fast response, and versatility required to realize capabilities of capillary columns.

The beta-ray device has a detectability in the range of $10^{-14}$ moles of sample in carrier gas, and the flame detector, says P-E "is somewhat better." Effective volume of the flame detector is 1-3 cu. mm., against 5 cu. mm. for the beta-ray device. Electrical response time for both is 1 millisecond. Though both are differential detectors, they have such high signal/noise ratios and stability that no reference cell is required.

PE says its flame detector is completely free of drift. Essentially, it's noted, the beta-ray detector is also. Both may be programmed for changes in temperature during a run, and the beta-ray may be programmed for variance of pressure. These new ionization detectors permit use of economical wide-span (0-100 mv.) fast-balance potentiometers or high speed recording milliammeters.

Features such as these augur well for this new instrumentation in the process and quality control of many operations. Although created primarily as powerful new research tools, they have vast potential in more prosaic fields where stability and reliability are as useful as extreme sensitivity. —*End*

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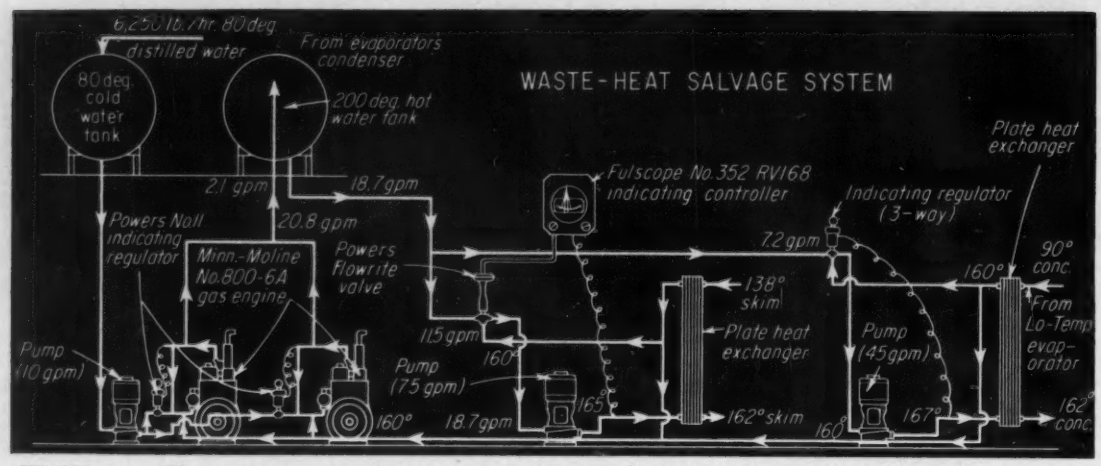



HEAT from two 75-hp. gas engines is salvaged by condensed water evaporated from milk. Brought to 200F., water is employed to heat-treat milk and concentrate.

# Boilerless Plant Uses Heat Pumps

**—to evaporate water from milk and to supply heat for hot-water circulating system that's employed for pasteurizing milk and reheating concentrate**

HAILED as a major economical breakthrough is a new South Dakota operation wherein 180,000 lb. of skim milk are concentrated and dried daily without a boiler system.

This is the performance at Farmer's Cooperative Creamery, Madison, S. D., which credits its success to use of a double-effect Lo-Temp evaporator (Mojonnier) on the heat-pump principle.

System may also be designed for concentrating and drying whole milk, whey, stickwater (fish and packinghouse waste), heat-sensitive animal blood, etc.

Entire closed system operation takes only 17 min. to convert milk from fluid to cooled, bagged powder.

New installation employs two 75-hp. gas engines (Minneapolis-Moline) that supply power for the two 6-cylinder, 1,000 rpm. ammonia compressors (Vilter)—the heat pumps (see photo).

Low-cost operations are geared to salvaging latent heat from compressors and gas engines. Engines' heat is used for hot water-circulating system that pasteurizes milk, reheats concentrate, and supplies hot water for plant and equipment cleaning and other facilities. Compressors' heat is employed for evaporating milk and condensing product's water vapor.

## What's Accomplished

Engines operating the two compressors consume 1,660 cu. ft. of natural gas hourly. At a cost of 58¢ per hr., the "boilerless heat" is furnished to—

. . . Pasteurize 9,305 lb. of skim milk.

. . . Evaporate 7,527 lb. of water.

. . . Condense same amount of water vapor from milk.

. . . Reheat 1,778 lb. 45% concentrate from 90 to 162F.

. . . Provide adequate hot water for all plant cleaning operations, shower baths, lavatories, standby propane vaporizer, and solution mixing tanks.

. . . Supply sufficient 80F. distilled water for making up acid and alkali cleaning solutions.

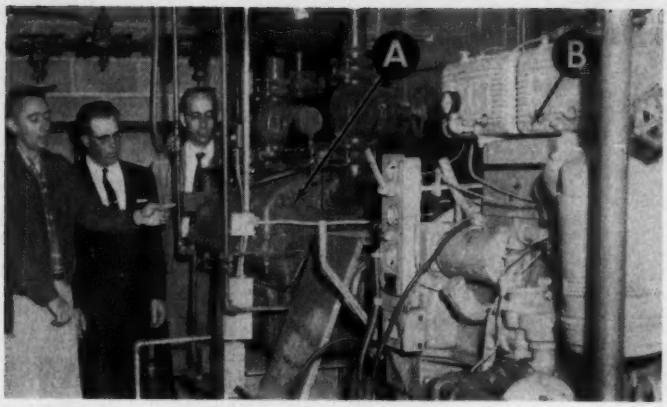
## Water Heating Details

System works like this: Water (80F.), evaporated and condensed from milk is pumped into a 500-gal., ceiling-suspended tank at 7,527-lb/hr. It is then gravity-fed (10 gpm.) to a 1-hp. centrifugal pump that boosts pressure to 20 psi. at inlet to two diaphragm-operated, thermostatically controlled valves. It proceeds to gas engines' jacket cooling circuit, where it's recirculated at 80 gpm. by engines' pumps (see drawing above).

When circuits' water exceeds 200F., self-action valves, modulated by thermostat bulbs in pump-recirculation lines, open to admit 80 deg. water. At same time, a corresponding amount of 200 deg. water is forced out to a 2,000-gal., asbestos-insulated holding tank.

**For pasteurizing milk,** hot water is gravity-fed at 11.5 gpm. through a 3-way mixing valve (Taylor) to a 3-hp. pump. The 165F water is pump-recirculated through plate-type pasteurizer at 75 gpm. As water preheats skim milk (8.6% solids) from 40 to 137F. and from 137 to 162F. for a 16-sec. pasteurization, it's dis-

**CARL E. ZURBORG, J. A. CROSS, and VIC ROSS**
Engineers, Mojonnier Bros. Co., Chicago




**HEART** of low-cost milk-drying plant: Ammonia compressor (A) serves as heat pump, powered by gas engine (B). Compressor supplies heat for evaporating milk and condensing product's water vapors. Engine's heat is employed for hot water circulating system that heat-treats product in-process.

charged to mixing valve. Pasteurized milk is cooled to 71F. by incoming skim milk which, in turn, is heated to 138F.

Controller-recorder modulates valve to blend sufficient 160F. return water (from pasteurizer) with 200F. water (from tank) to maintain 165F. temperature.

When flow of 160 deg. water through mixing valve is throttled, pressure built up in line diverts its flow to gas engines for reheating to 200F. Again, self-acting controls admit 2.1 gpm. of 80 deg. water to cool gas engines and to reheat bypassed water to 200 deg.

Pasteurized milk enters evaporator, where water is distilled from it at 91F. in 1st-effect and 82F. in 2nd-effect.

**For reheating concentrate (45% solids)** from 90-162F. before spray drying, 165F. water is similarly used. Employed are a self-acting temperature controller and mixing valve.

Concentrate enters tube-type spray dryer through a single nozzle at 2,500 psi. Concentrate is air-suspended during initial drying by heat supplied from direct-fired gas furnace. A redryer closely balances product's moisture content.

Hourly rate through dryer: 1,778 lb. of concentrate to yield 825 lb. of milk solids (97% solids) and 935 lb. of spray-dry evaporation. Drying-fuel cost for 2,050 cu. ft. of natural gas per hour amounts to $0.72.

Milk solids are collected by sanitary-type cyclones and skimmer. They're finally cooled to less than 100F. before entering bagger.

## Workings of Heat Pump

Relative to heat-pump operation: On heating cycle, compressed refrigerant gives up its heat to the milk in the 1st-effect evaporator. Water evaporated from the milk is used for further product evaporation in the 2nd effect.

As the refrigerant looses its heat, it's then used to condense product's water vapors in evaporator's condenser. As stated, this water is directed through gas engines, where it's heated for the hot water system employed for pasteurizing milk and and reheating concentrate. Refrigerant's temperature is again raised by compression, and then product evaporating and water vapor-condensing cycle repeats.

Automatic panel-board controls eliminate need of close attention to operating details. One man easily operates the drying plant, while a second bags and warehouses milk powder in a 60x141-ft. metal-framed Butler building.

Automatic controls offer triple thermal cut-out protection for all motors on evaporator and dryer to make operations foolproof as well as meet underwriter's requirements. Main circuit breaker contains a thermal cut-out. Each magnetic starter (with individual thermal cut-outs) is protected by circuit breakers. And these pushbutton-operated starters also contain thermal cut-outs.

As a further safety feature, two flame sensors control spray dryer's main gas furnace and the smaller one for heating air used for redrying. Also, when a flame goes out, a squawker sounds. Mounted on panel board are indicating pilot lights for motors, flame sensing controls, and squawker.

Plant's tower area occupies 32x35 ft. of floor space. It houses heat-pump evaporator and spray dryer that are secured to structural steel framework. Latter also supports low-cost building panels, part of the warehouse and engine room. —*End*

## Heat Balance Pinpointed

Process heat requirements are based on an hourly design capacity of 9,305 lb. of 40 deg. skim milk (8.6% solids); 7,527 lb. of Lo-Temp evaporation; 1,778 lb. of concentrate (45% solids); 933 lb. of spray-dry evaporation; and 825 lb. of nonfat milk solids (97% solids).

**For pasteurizing** (80% regeneration): Heat load for heating 9,305 lb. skim from 40 to 140F. (by regeneration) and 140 to 162F. (by hot water), holding 15 sec. and cooling from 162 to 65F. (by regeneration) calculates out to 9,305x(162-140), or 204,710 Btu.

**For concentrating to 162F.:** Heat load amounts to 1,778x(162-90), or 128,016 Btu.

Heating requirements for pasteurizing and concentrating total 332,726 Btu.

**For two gas engines:** Both require about 11 cu. ft. of 1,000 Btu. gas per hp.-hr. Total is 1,650 cu. ft. of gas per hr., with 1,650,000 Btu. of combustion heat. This heat is distributed to: (1) Power friction and radiation, 30% or 495,000 Btu.; (2) exhaust gases, 33% or 544,500 Btu; and (3) water (circulated through engine cylinder and exhaust manifold jackets), 37% or 610,500 Btu.

Further breakdown: Combustion heat of 610,500 Btu. is picked up by evaporator's product-condensate water circulating through engine jackets and exhaust manifolds. Of this amount, 365,975 Btu. heat milk and concentrate. Remaining 244,525 Btu. is available for other purposes.

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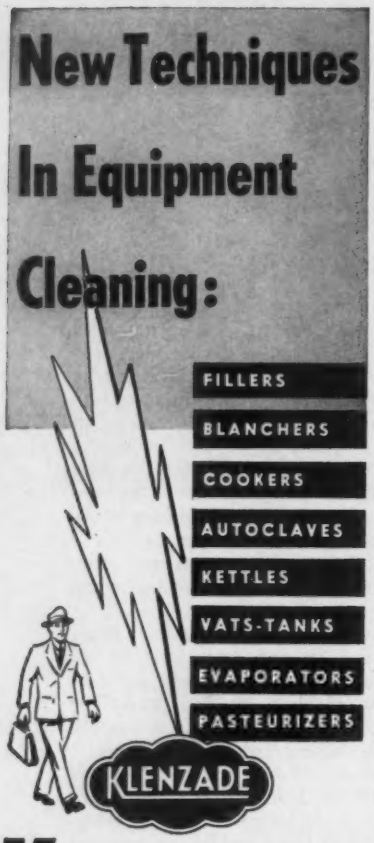


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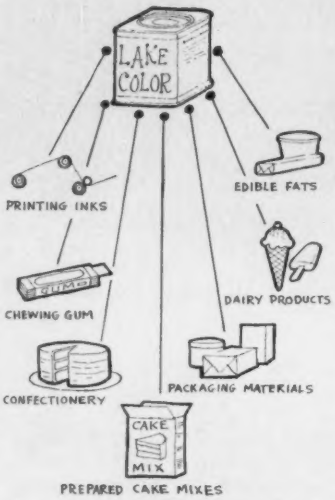
# Color-Lake OK Clears Way

**FDA's approval of combination-form FD&C hues opens road to more attractive products and packages**




**WIDE VISTAS loom for new hues.**

AVAILABILITY of a broad line of harmless food colors now seems assured, with certification by FDA of "lakes" of FD&C colors.

In accordance with the new regulation, these food-hue lakes are made by extending, on a substratum of alumina, a salt prepared by combining one of the certified water-soluble colors with the basic radical aluminum or calcium.

Resulting colors are odorless and tasteless, and will not bleed. They provide greater resistance to oxidation and light than present ones.

These new products, points out Samuel Zuckerman, v-p H. Kohnstamm and Co., offer a more extensive choice of shades than was previously available. This is particularly pertinent to food processors, and makers of such supplies as protective coatings, high-polymer packaging materials, papers, plastics and printing inks.

## Typical Uses Seen

Signalled to begin as this number of FE was mailed (FDA set starting date at 60 days from May 13), employment of the new lakes affords such potential applications as the following—

**Packaging Materials.** Earlier, the water-soluble FD&C colors couldn't be used with polyethylene and polystyrene because of their low color values in non-aqueous systems, and their bad bleed in contact with water systems. But the new colors can be employed satisfactorily with these polymers, and they provide the safety and protection of the water soluble colors.

**Edible Fats.** Here, the new lakes, when dispersed, give non-bleeding stable products. They will be available in yellows, oranges, reds, greens, violets, and blues.

**Printing Inks.** Lake colors have been used here for years. Now their availability as certified food colors will permit use of printed food container and inserts with colors certified for use on any food. Inks can also be made for printing on the food itself.

**Chewing Gum.** The new hues will permit gum manufacturers to prepare colored products that won't bleed and stain the mouth of the user, and the color will last through the chewing.

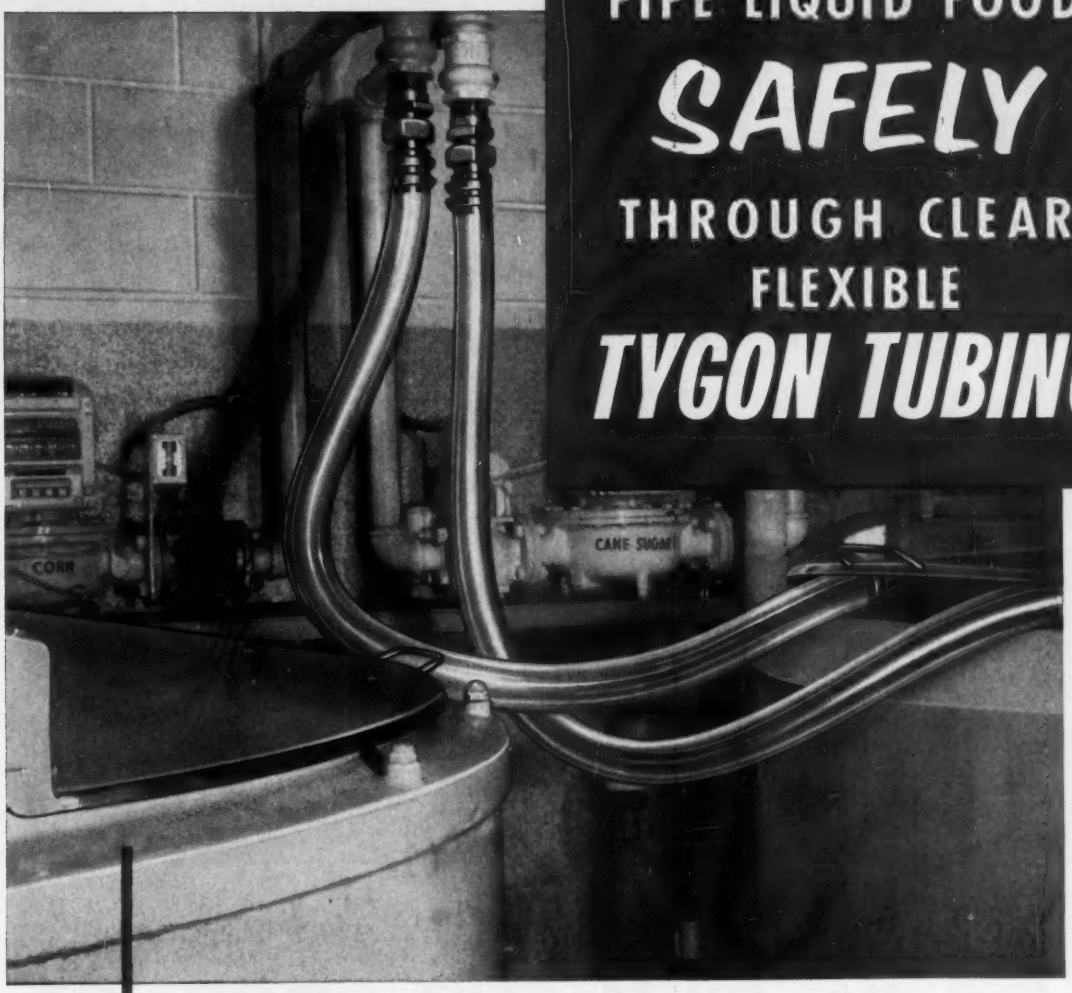
**Confectionery Products.** New multicolor novelties will be possible, since the lakes will not bleed into one another as do water soluble colors. Designs or slogans can be printed on the products. Coatings for ice cream, candy, or bakery goods are other likely uses.

**Prepared Cake Mixes.** Here, they will permit closer similarity between package-displayed colors and those of the finished product. And these hues will be more heat stable and easier to incorporate.

**Dairy Products.** They will provide the ice cream maker with a wide range of colors in case the presently used fat-soluble coal-tar colors are delisted. For cheese products, as well as the wax coatings frequently used on them, lake colors show great promise.

The new 'lake' ruling resulted from proposals made by H. Kohnstamm & Co. (Feb. 9) that provisions in the color-certification regulations applying to lakes of FD&C colors (currently not certified for food uses other than for external application to shell eggs) be amended to permit additional uses.—*End*

# PIPE LIQUID FOODS SAFELY THROUGH CLEAR, FLEXIBLE TYGON TUBING




Less expensive than stainless steel, Tygon flexible-plastic Tubing combines the best features of both rubber and glass, without the disadvantages of either. It is the ideal piping medium for handling liquid food products.

Tygon Tubing gives you the solution visibility of clear glass, without the danger of breaking. It gives you the flexibility of rubber without the danger of contamination. Light in weight, strong, abrasion resistant, Tygon Tubing can go from "anywhere to anywhere" with fewer fittings, less assembly time.

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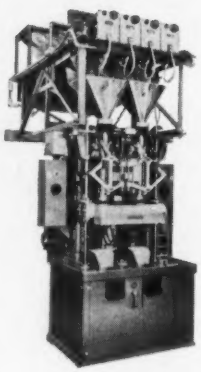
New also, is the improved impulse sealing mechanism for polyethylene with a cold-wire cut-off that gives a ⅛" seal at the ends of the package. This thin-line sealer saves Lewis as much as 7% in material over packages run on a conventional machine.

The Transwrap machine comes in two models, the TWB and TWC, both with new design features to improve packaging operations and cut costs. For complete information, contact your nearest Package representative today.



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### Source of Cured-Meat Flavor

That bacteria in curing brines, contribute to the flavor of the cured meat is now demonstrated.

Pieces of bicepts muscles of hams (50 g. each) were held at 38F. post slaughter for 2-7 days, then removed aseptically after thorough cleaning of the surface and disinfection with a 1:1000 solution of Zephiran in 80% ethyl alcohol.

Half of the chunks (controls) were cured in a 6% NaCl chloride brine containing 1.5% sucrose, 0.09% $NaNO_3$ and 0.009% $NaNO_2$.

Other ham chunks were cured in the same brine inoculated with a gram negative flagellate rod, closely related to *P. nigrificans*, and previously found to have a desirable effect on cured meat flavor.

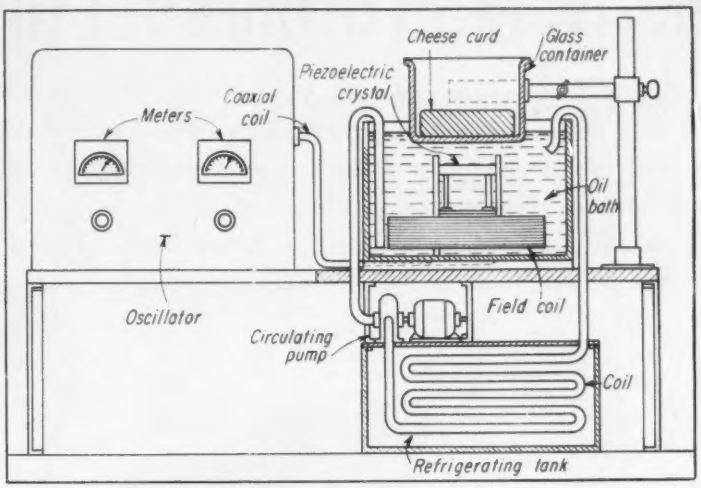
After 3 days at room temperature, during which bacteria multiplied 7-fold, brines, meat extract, and meat were tested organoleptically, and histological examination of the meat was made. Triangle taste tests showed that the bacteria produced a distinctive flavor. No bacteria were found within the meat tissue, hence the changes resulted from passage of bacterial metabolites from brine into meat.—*Applied Microbiology* 7(2), 81-83, 1959.

### Findings on Synthesis of Fat

Fat can be produced in considerable quantity by a number of species of fungi, among them *Penicillium spinulosum*, when it is grown on a glucose-salts medium. Both shake-flask cultures and a 30-l. Waldhof type fermentor have been used.

In shake cultures mold felts containing up to 36.6% fat (dry basis) were obtained, yield of fat being 5.1-8.7% of glucose utilized. Waldhof fermentor felts containing 40.6% fat (dry basis) and 9.4% yield on sugar used were obtained.

When residual liquor from a fermentation was fortified with glucose and other nutrients and reused, fat production and sugar utilization were improved. A yield of 1.67 g. dry mold felt per 100 ml. of medium was obtained. Felt contained 46.7% fat and yield on sugar utilized was 11%. —*J. Sc. Food & Agr.*, 9(12), 824-28, 1958.




## Ultrasonic Treatment of Cheese Curd Gives Better Product in Less Time

Accelerating ripening of cheese by subjecting the curd to sound waves having frequencies of 100-100,000,000 cycles/sec. before storage is object of a recent patent.

Employed may be either a piezoelectric crystal or a transducer. Preferred frequencies range from 200,000-1,000,000 cps., and times from 1-5 min. Energy input should be 0.1-1.0w. hr./lb. curd.

Product may be placed in direct contact with frequency source, or waves may be transmitted through gas, liquid, or a solid diaphragm. However, direct contact is more effective.

In the piezoelectric unit (drawing above), unripened curd is placed in a glass container suspended in an oil bath and above the crystal. Oscillator is then tuned (by knobs on panel, left), and power applied to produce an energy transfer of 25w. hr./lb. curd. Distance between container and crystal is adjusted to obtain maximum transfer of energy to cheese. This is indicated by meters on panel that measure plate and grid currents, respectively. Temperature of oil and cheese is maintained at about 70F. by circulation of the oil through coils in refrigerating tank.

Following a 10-min. treatment, cheese is removed from container and aged at 45F. Tests have demonstrated that cheese so treated develops flavor and body in 6 weeks superior to untreated controls aged under similar conditions in 4-5 months.

In addition to natural cheese, process is said to be effective for filled and processed cheeses, and cheese foods.—U. S. Patent 2,882,164, April 14, 1959.

### Low Density Solvents Best For Soybeans

Extraction rate of soybean oil from flakes depends on the law of viscous flow in capillaries, is independent of molecular diffusion, and is almost unaffected by counter-current action.

Laboratory determinations have successfully estimated time of extraction and volume of a commercial extractor, using hexane as a solvent.

Data on action of acetone, butyl bromide, carbon disulfide, carbon tetrachloride, chloroform, iso-propyl alcohol, nitromethane, toluene and trichloroethylene have also been obtained.

Extractive action depends on physical properties of solvent, rates increase with low viscosity, high density, and high surface tensions. Physical properties of the oil-solvent

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have an important bearing on results.

If solvent is less dense than soybean oil, and its solution changes the surface tension and initially low viscosity very little, extraction rate will change less with increasing oil concentration than with solvents of greater density, but relatively constant surface tension and viscosit. Thus acetone solutions have about the same extraction rate from 0-20% of oil and resemble hexane in this respect.—*Ind. & Eng. Ch.*, 51(4), 543-46, 1959.

### Chocolate Foam Topping

A method and formula for the manufacture of a chocolate flavored topping is the object of a recently granted patent.

Topping is prepared by mixing and dispersing together chocolate flavor, fat, sugar, and concentrated milk. Flavoring agent may be cocoa or chocolate liquor. Concentrated milk may be made by mixing dry milk with water or with whole milk.

Above mixture is then packaged under gas pressure so that when it is dispensed it will be aerated into a foam-type topping.—U. S. Patent 2,883,286, April 21, 1959.

### Water Absorption of Flours Varies With Starch Damage

Type and composition of wheat, method of milling, and degree of extraction are important factors influencing water absorption of flours.

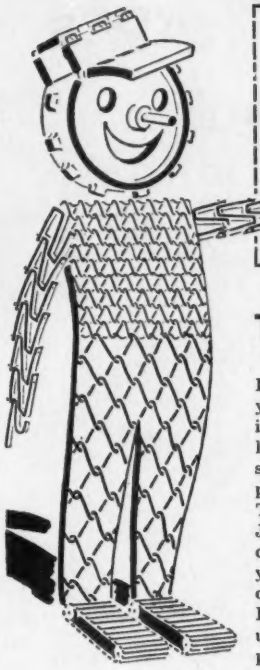
Measurements of absorption on 23 samples from 2 English wheats, Atle (hard wheat) and Hybrid 46 (soft wheat) showed variations from 47.1-50% for the latter and from 52.1-53.98% for the former.

Differences in protein content, and amount of damaged starch present accounted for 90% of the absorption differences. Starch damage is greater with the hard wheat and increases with the protein content.—*J. Sc. Food & Agr.* 10(4), 248-52, 1959.

### New Fly-Control Methods To Get Early Tests

Two new methods that have proved useful against house flies in large scale research campaigns will be subjects of small-scale field trials against other insect pests this summer.

The two methods are: Sterilization of male insects by radiation, and use

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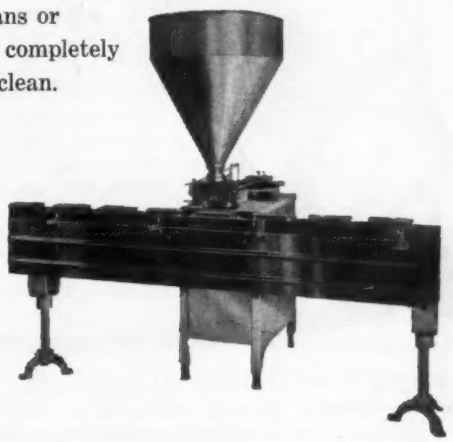

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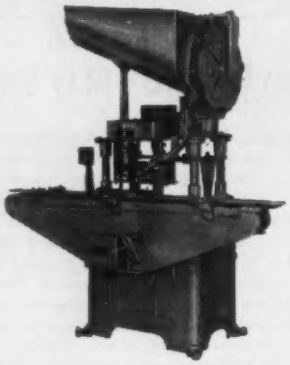

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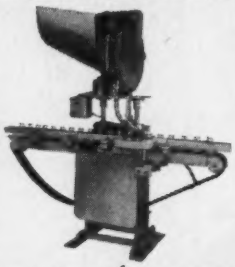

Automatically selects plastic fitments (solid or perforated) with or without lift tabs and orients them into a chute. Passing container picks up fitment which is then snapped on the container. Speeds available up to 120 per minute or higher.

***Descriptive literature and specifications on request.***

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**silicone release agent**
ON HAND-IRON SEALING BARS

SLIPICONE® makes sticky spots slick . . . prevents adhesives, packaging materials, foods and food products from sticking where they're not wanted. SLIPICONE keeps equipment clean, cuts downtime and maintenance costs, speeds operations . . . SLIPICONE saves you time and money!

SLIPICONE is nontoxic, won't attack any surface, and is unaffected by temperatures from —40° to 400° F . . . won't gum-up or run-off equipment when heated. Try SLIPICONE, the Dow Corning silicone release agent, now . . . and give your sticking problems the slip!

Get SLIPICONE from your paper merchant, packaging materials supplier, or write to Dept. 5519.

Just spray or wipe it on: Sold in 12 oz. aerosol cans, 2 and 8 oz. tubes, 10 lb. cans.

first in silicones

**Dow Corning** CORPORATION
MIDLAND, MICHIGAN




of attractants added to insecticides. In lab experiments at Beltsville, Md., certain chemicals and drugs have been found to inhibit growth of ovaries in house flies. Since this would prevent egg production in females the method could lead to a high degree of control.

Other experimental combinations are designed to eliminate male flies and thus eventually eradicate the entire population.—*USDA Press Service*, No. 786-59.

### Gibberellins Aid Malting

Of 5 types of growth activators applied to germinating barley in a pilot plant, only $KBrO_3$ and gibberellins showed significant effects.

At concentrations up to 0.5%, extract, diastatic power, alpha-amylase, soluble protein and rootlet growth were progressively reduced by former. Up to 100 ppm. gibberellins, however, increased extract yield 1%, raised diastatic power from 220-246 deg., alpha-amylase from 76-100 units, soluble protein of malt 1.22%.

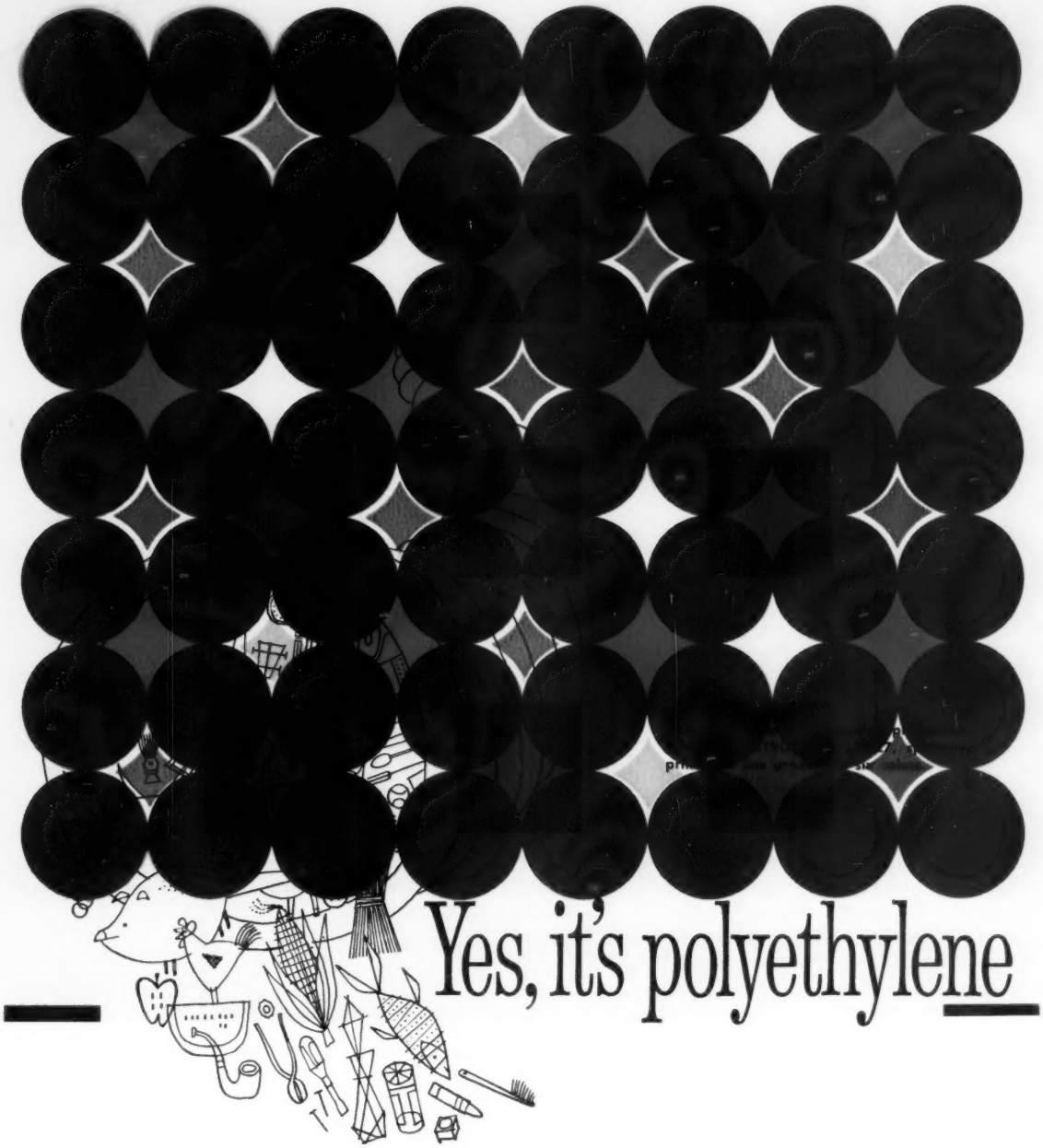
Unlike $KBrO_3$, gibberellins did not decrease rootlet growth, but decreased respiration loss and increased wort color during malting.—*Paper by Bawden, Dahlstrom & Stat* (Rahr Malting Co.), at ASBC, Montreal, May 1959.

### Diacetyl Formation in Beer

Diacetyl imparts a sweetish aroma and taste to beer that is objectionable to some consumers at 1 ppm. Its origin has been traced to specific bacterial infections (sarcina sickness), but it's also found in beers free of these. Here, it's due to a special phase of yeast metabolism involving synthesis of the amino acid valine, in which diacetyl is a byproduct.

When valine is added to wort production of diacetyl is depressed. Other amino acids and nitrogenous compounds have no effect. Acetolactic acid, an intermediate in synthesis of valine from pyruvate, reduces diacetyl formation.

A yeast adapted to valine synthesis from a valine-deficient wort may be rich in valine-synthesizing enzymes and thus liberate diacetyl. Since yeasts can be readily tested for their valine absorptive powers, cultures of single-cell isolates having low valine absorption rates should not be selected for propagation when diacetyl flavors in beer are a consideration.—*Paper by Owades, Maresca & Rubin*, (Schwarz Lab.), at ASBC, Montreal, May 1959.



# Yes, it's polyethylene

Add brilliant printability to the clarity, toughness, moisture and grease resistance of polyethylene film, and you have a packaging material that can be a powerful merchandising tool for your food products. Polyethylene film can be printed economically with clear, bright colors at high speeds and with sharp registration and good ink adhesion. Products can be bagged or wrapped on automatic equipment — sealed by heat-sealing or with adhesives.

**Opens New Packaging Film Markets**

Package designs that combine sparkling, multi-color printing with polyethylene film's clarity open up new packaging and merchandising opportunities for you. Printed film is now being used successfully for packaging frozen food, produce, bread, meat, dairy products, candy and a wide variety of other food products where visibility, eye-catching sales message, and protection can be combined to give maximum sales appeal.

**When you investigate the merchandising possibilities of printed polyethylene film for your packaging needs, ask your supplier about the special advantages of film made from U. S. I. PETROTHENE® polyethylene resins. These films offer greater clarity at a given strength (or greater strength with no loss in clarity). Films made from PETROTHENE polyethylene are available in a wide range of thicknesses, with a combination of special properties to meet your every packaging need. Your supplier will be happy to advise you about them.**

**U.S.I. INDUSTRIAL CHEMICALS CO.**
*Division of National Distillers and Chemical Corp.*
**99 Park Ave., New York 16, N.Y.**
***Branches in principal cities***

# YESSIR, THAT'S POLYETHYLENE!

*Polyethylene bags are tough . . . clear . . . inexpensive. Your only problem is fitting the bag to the job. Here's some help:*

Growers and packers like polyethylene. Its strength carries bulky produce through a lot of rough handling. Its clarity and convenience boost consumer sales. And of course, it's the most inexpensive transparent packaging material you can buy.

**To Get the Most Value from Your Polyethylene Packaging Dollar, Keep these 3 points in Mind—**

• HOW MUCH STRENGTH . . . HOW MUCH CLARITY? Strength and clarity are built into polyethylene film through the resin. Generally, the more you want of one the more you have to give up of the other.

• MORE BAGS FOR THE SAME MONEY IS NOT ALWAYS THE BEST VALUE. You are probably simply getting thinner bags. You can easily lose more in packaging line delays and package failures than you save in first cost. To get exactly what you want—

• DECIDE ON YOUR NEEDS, THEN SET YOUR OWN SPECIFICATIONS. The film converter working with the resin manufacturer can vary such factors as bag size and type, thickness, package design, film strength, clarity, and slip.

Specify on your order exactly what characteristics are most important for your own needs; your converter can give them to you.

*More and more, packers and growers are setting specifications for their polyethylene bag purchases. U.S.I., makers of PETROTHENE® quality polyethylene resins, will be glad to assist you and your supplier in selecting the right materials for your packaging needs.*

**FREE**—To help users select and specify the polyethylene film best suited for most common flexible-packaging applications, U.S.I. has prepared a 4-page data sheet, "Which Polyethylene Film Should I Use?", which lists specific film properties required for specific uses. Also available is U.S.I.'s 8-page booklet, "Formulas and Tables for Polyethylene Film and Bags", to be used for calculating bag and film thickness to be expected from given weights of polyethylene. For your copies, write to U.S.I. at the address below.

**U.S.I. INDUSTRIAL CHEMICALS CO.**
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**99 Park Ave., New York, 16, N. Y.**
***Branches in principal cities***

# MEN & COMPANIES

**Armour Streamlining** . . . What is objective of recent Armour & Co. organizational shifts?

Word from F. B. Patton, who has been upped to senior v.-p., is that modern merchandising puts bee on correct integration of company operations.

Mr. Patton formerly headed Armour Auxiliaries Div., now discontinued. In new assignment, he assists Exec. V.-P. E. W. Wilson in administration of Armour Chemical Industries.

**F. B. Patton**

New Grocery Products Div. combines canned foods and soap business.

**Howard F. Roderick**

**Citric Acid & Enzymes Push** . . . Newly-formed Miles Chemical Co. will up food and beverage activities.

Move consolidates Sumner Chemical Co., Zeeland, Mich.; Takemine Laboratory Div., Clifton, N. J.; and citric acid production of Miles Laboratories, Ekhart, Ind.

Tapped for president is Howard F. Roderick, who joined Miles Labs as v.-p. in January.

Targeted is "diversification through research and acquisition." Current $3.6 million expansion at Elkhart headquarters, to be completed this fall, will double citric acid output.

Long-range plans include international production.

**Navy 'Fan'** . . . "I am happy I've been able to do a few little things for the Navy."

So says Erwin C. Uihlein, president of Jos. Schlitz Brewing Co., recipient of Navy's distinguished public service award.

Presentation, by Rear Admiral E. P. Forrestel, was part of Armed Forces Day recruit graduation ceremonies, Great Lakes, Ill.

Mr. Uihlein was cited "for outstanding contributions in public information, morale, and welfare."

**Erwin C. Uihlein**

**W. Gardner Barker** is now president and chief executive officer of Thomas J. Lipton, Inc. He succeeds retired **Robert B. Smallwood,** formerly chairman, president, and chief executive officer.

**Ralph F. Baxter** has joined Hunt Foods & Industries, Inc., as corporate planning director, a newly-established post.

**Mortimer W. Brenner,** v.-p. & brewing director of Jacob Ruppert Brewery, has been elected '59-60 president of American Society of Brewing Chemists, Montreal.

*Sheftene Sodium and Calcium Caseinates* improve the quality of your product line in either, or both, of these basic ways:

I

**SHEFTENES** are a source of high-quality milk proteins, with an abundance of lysine and tryptophane. As such, they are unsurpassed for improving the protein quality of foods—wheat and grain products particularly.

II

**SHEFTENES** are versatile *functional* ingredients. They are used — efficiently and economically — to enhance the texture, appearance and shelf-life of bakery, cereal, dairy, meat products, beverages, infant foods and many others.

**SHEFTENE** products come in powder form, are soluble and possess no marked flavor or odor characteristics of their own. Write today for samples and technical data to Dept. FE-79.

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A DIVISION OF NATIONAL DAIRY PRODUCTS CORPORATION
Western U.S. distribution through
Van Waters & Rogers, Inc. — Seattle, Spokane, Portland, Dallas, Houston
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Braun Chemical Company — Los Angeles, San Diego, Phoenix, Albuquerque, El Paso

PROCESS FOODS WITHOUT DANGER OF CONTAMINATION

The EXCLUSIVE snap-apart design of the new

CogMill

permits quick, thorough cleaning of every product contact area, all of which are of stainless steel.

The CogMill is being used to process cheese, spices, dough, crackermeal, horseradish, peanuts, dehydrated beef, chicken bones and even metallic oxides.

CHOPS · GRINDS · GRANULATES PULVERIZES solids, and BLENDS liquids and solids to any desired consistency.

Models for manual or continuous feeding by 7½ to 20 H.P. motors. Variable speed feed screw with jacketed inlet and outlet for

TEMPERATURE CONTROLLED PROCESSING.

Send for details, designating product to be processed.

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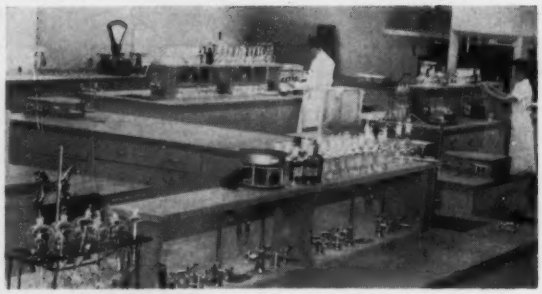


**At FDA's new Detroit district headquarters,** technicians prepare food tests in special purpose lab (above), one of seven in facility. Included are two chem labs, bacteriological unit, and natural-light lab for color work in food additives and pesticides. Two-story, $1 million building, named in honor of Commissioner Dr. George P. Larrick, achieves twin-distinction of being first district office opened in 25 yr., and first ever specially designed for FDA work.

## Industry

**Armour & Co.** has stopped slaughter at 6 of its 32 plants, including Chicago. Company spokesman commented on "substantial losses" attending discontinued operations "for several years." Action points up trend among packers to replace "antiquated" large installations with smaller, modern plants nearer livestock sources. **Swift & Co.** also has ended all cattle slaughter and processing in Chicago.

**Birds Eye Div. of General Foods Corp.** has sent nearly 5 tons of frozen foods to American National Exhibition opening this month in Moscow. Shipment includes 32 different fruit and vegetable products, 7 juice concentrate flavors, 13 specialty items, poultry, fish, etc. Frozen food business, currently celebrating 30th anniversary, covers about 1,600 packers, and amounts annually to approx. $2.5 billion (retail).

**Miller Brewing Co.** has created new post of international sales manager, pointing up growing export demand for its "High Life" beer. New area has been assigned to firm's veteran J. G. Purtell.

**Minute Maid Corp.'s** international subsidiary—organized last year—reports "encouraging" expansion for its exports to more than 30 overseas markets. Firm has recently acquired minority interest in a new Mexican citrus-producing company, **Jugos Concentrados, S.A.** Operation, according to Robert M. Blake, president of MM International, will boost competitive aspects of MM's foreign selling.

**Seabrooks Farms Co.'s** rocky trip into harbor of new ownership has come to an end with **Seeman Bros., Inc.'s** contract to purchase some 98% of SF's common stock.

Deal climaxed managerial disagreements between company founder, Charles F. Seabrook, 78, board chairman, and his 3 sons, a director, a v.-p., and President John M., chief executive. Under latter's guidance, firm moved from '55 loss of $1.7 million to $713,000 profit in fiscal '59. All 3 sons have resigned.

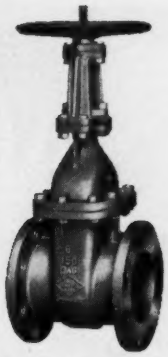
New Seeman Bros. officers include: John B. Fowler, Jr., chairman, Samuel Winokur, president, and Seabrook, père, honorary chairman.

Reported cost to Seeman Bros. is $500,000 cash and $2.5 million 1-yr. note. Among first actions of firm's new management has been purchase of Minute Maid's frozen pea plant at Lewiston, Ida.

## Associated Industries

**Crown Zellerbach** Executive V.-P. Reed Hunt will serve as exec. director of President Eisenhower's 1960 conference targeting occupational safety.

**Harris Laboratories, Inc.,** Lincoln, Neb., announces "necessity" for doubling capacity of firm's pharmacology div. because of increased demand stemming from "recent new government regulations related to pre-testing of additives to foods and feeds."



In this **Split Wedge Gate**

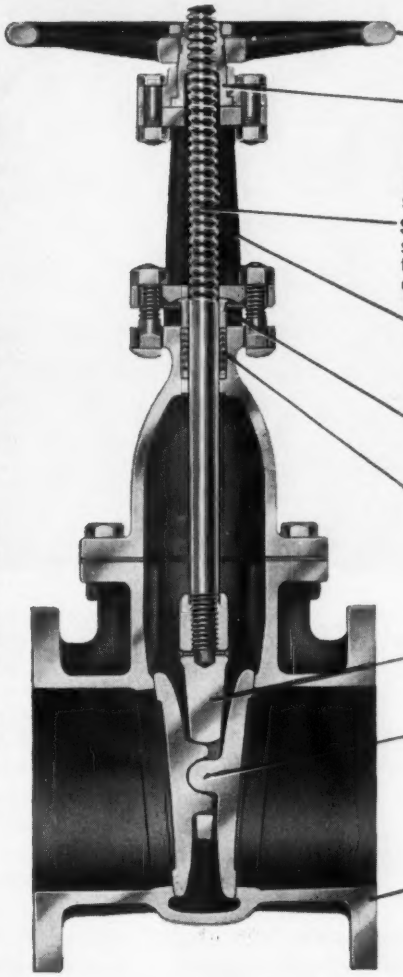
you can see why it pays to

# Specify JENKINS for STAINLESS STEEL Valves, too

This picture shows the many points of excellence in the design and construction of Jenkins Fig. 1327 Split Wedge Stainless Steel Gate Valves. Compare them with any valve you know. You'll conclude that it's hard to beat Jenkins at making valves, no matter what the material.

But no picture can show the quality of the castings . . . the precision machining . . . the rigid inspection and testing that have gone into this valve. All of these are as important as design and metal alloys in assuring long, dependable, economical valve service. And, all of them are up to the peak standards for which Jenkins has been known for almost a century.

SEND FOR NEW CATALOG of Jenkins Stainless Steel Valves. You'll find in it the patterns you want, in a choice of alloys that satisfy the requirements of practically all corrosive services. Also, you'll see that these Jenkins valves meet valve industry specifications and the high standards established by the leading users of stainless steel valves. Jenkins Bros., 100 Park Avenue, New York 17.



**WHEEL** of high strength malleable iron designed for firm grip and easy operation.

**YOKE BUSHING,** easily renewable. Made of bronze, for ideal thread engagement with stainless steel spindle, to prevent seizing or galling of spindle threads. Bushing of stainless steel is optional.

**SPINDLE** has long thread bearing surfaces with correct lead for easy, tight closing. Screws into wedge carrier, then secured by a stainless steel pin.

**YOKE BONNET** has liberal space between yoke arms for easy access to packing box. Precision machined flange face assures uniform contact with gasket for a tight body-bonnet joint.

**GLAND** consists of two pieces — gland flange and gland follower — eliminates binding of follower in case gland bolts are tightened unevenly.

**PACKING** of Chevron-type Teflon in large packing box prevents leakage. Only a minimum load is required on gland, extending service life of packing.

**WEDGE CARRIER** connects wedge to spindle and raises or lowers it. Husky in size to stand any operating strains.

**SPLIT WEDGE** is the ball-and-socket design which automatically adjusts to the tapered seating surfaces for positive shutoff. The discs, revolving freely in the wedge carrier, produce a self-cleaning action on seating surfaces and reduce possibility of galling and seizing.

**BODY** —Through-port design for full, free flow. Ample wall thickness and good design provide extra strength to withstand stresses. End flanges conform to M.S.S. specs.

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LOOK FOR THE JENKINS DIAMOND
VALVES

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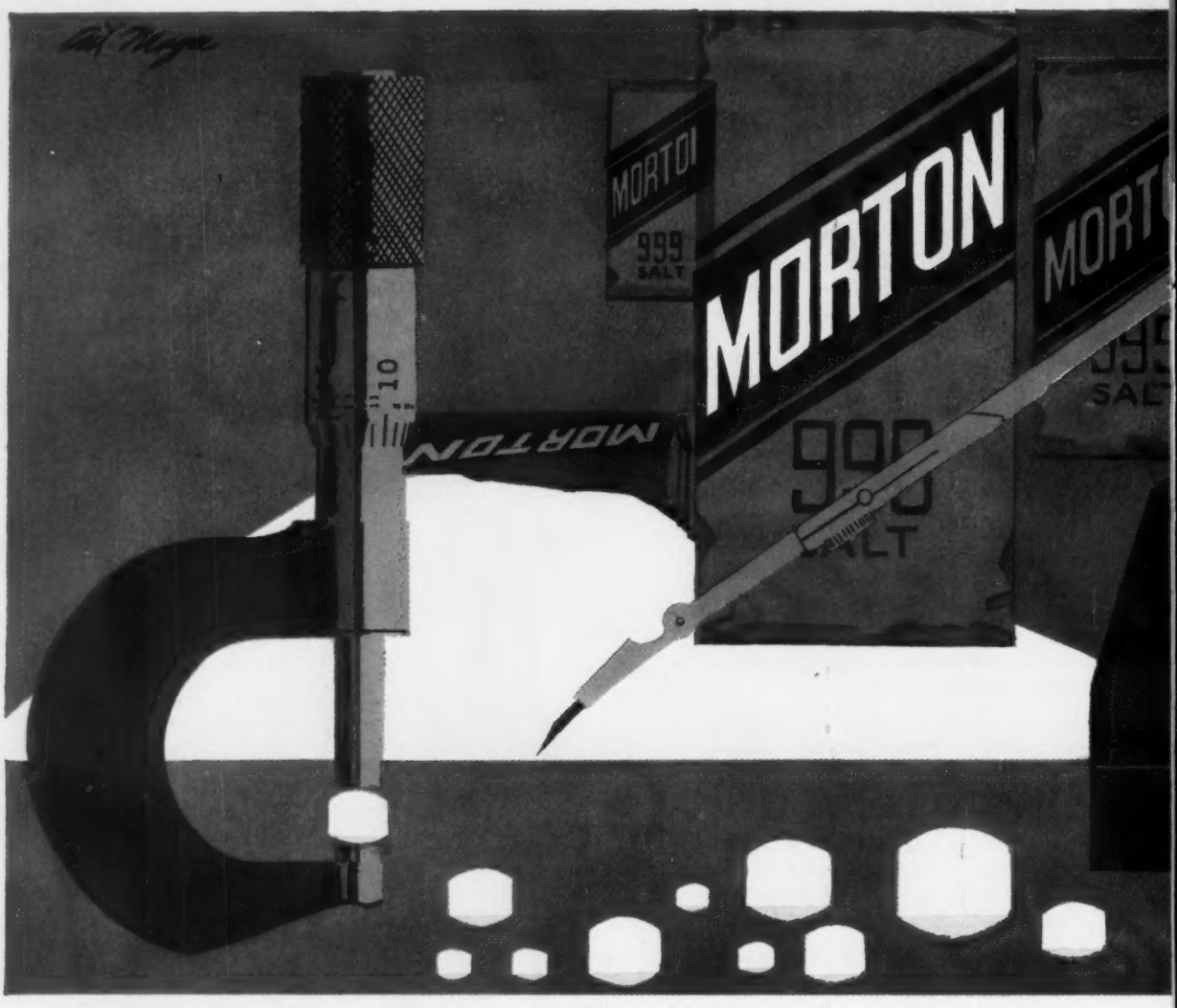



# Only Morton offers you the right salt, in any form–

Morton '999' Salt is the highest purity salt commercially available everywhere in the United States. '999' is a low price, premium grade salt entirely free from bitter calcium and magnesium compounds that can distort flavor. Morton '999' is always 99.9% clean, pure sodium chloride, exceptionally low in the trace metals copper and iron.

What's more, '999' quality never varies from shipment to shipment whether you buy a bag or a carload.

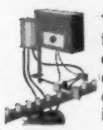
Morton also offers you high purity '999' Salt in handy tablet form. You get tablets that are always the exact weight, size and blend you require for accurate flavor control.

Morton combination tablets are precision made to your exact requirements. You can order Morton Salt blended in unvarying amounts with ascorbic acid . . . spices . . . citric acid . . . sulphur . . . M.S.G. . . . calcium chloride and other flavoring agents. Tablets come in 10-grain to 400-grain sizes.

Morton offers a complete line of tested and approved dispensers to help you reduce labor costs, eliminate waste and assure better flavor control through accurate dispensing of seasonings and preservatives. Technicians are available to help you select and install the dispenser or brinemaker best suited to your needs . . . to assist with initial use and provide regular follow-up maintenance to assure efficient, trouble-free operation that saves you time and money.

*All dispensing and brinemaking devices are serviced by Scientific Dispensing Co. Division of Morton Salt Company.*

# and dispensing service to meet your special needs



**The amazing Flocron Liquid Dispenser** works electronically—remote controls permit you to "dial" the exact amount of liquid ingredients required for various can sizes. Handles up to 300 units per minute. Can be operated on existing equipment without revising existing production lines.

**The Salt Tablet Depositor** automatically deposits salt tablets in as many as 700 cans a minute. Guaranteed accuracy. Automatic models work on a "no can, no tablet" and a "no tablet, line stops" basis. Depositors come in special sizes . . . will place tablets in narrow mouth bottles, cans and jars.

**The Morton Model-E Brinemaker** is specially designed to produce up to 800 gals. of brine per hour from readily available '999' Salt. No space-wasting storage tank needed. No need for costly shutdowns for cleaning out sludge or impurities.

**The Bulk Salter Machine** dispenses salt, sugar, M.S.G., and other seasonings in dry form. Serves up to 400 cans per minute—if no can is present, no seasoning is released. Machine can be filled and supervised by unskilled labor.

**Write today for more information!**

We'll be happy to send you more information about high purity Morton '999' Salt... the Model E. Brinemaker... Flocron Liquid Dispenser... Bulk Salter Machine or the Salt Tablet Depositor.

**MORTON SALT COMPANY**

INDUSTRIAL DIVISION

*Dept. FE-7, 110 No. Wacker Drive, Chicago 6, Illinois*



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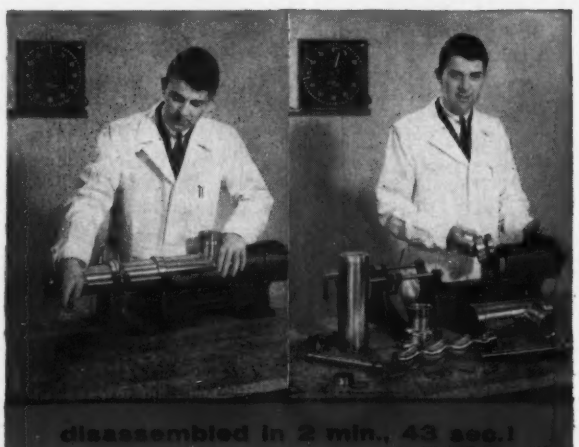
MOYNO®
FOOD PUMPS

# MOYNO®... *the "Quick-to-clean"* Food Pump that even *Pumps Suspended Solids!*

A MOYNO Food Pump can easily be disassembled in 2 minutes and 43 seconds for thorough, effective cleaning and be back on duty in minutes. MOYNOS eliminate long, costly cleanups that rob production time. Foods stay pure too, because MOYNO'S smooth internal contours won't collect particles where bacteria might thrive, and bearing lubricant is completely isolated from pumping compartment to prevent contamination.

Any food product that will move through a pipe—from cider to lumpy potato salad—can be pumped with a MOYNO. The *"progressing cavity"* principle that distinguishes MOYNO from all other pumps explains this remarkable capability. The cutaway model above shows the screw-like, reversible rotor that revolves in a double-threaded stator to create these progressing cavities. Material flows smoothly and uniformly, without pulsation, aeration, agitation or disintegration. All wettable parts are stainless steel—or stator may also be synthetic rubber, odorless bakelite or other material, depending on service requirements. If needed, off-the-shelf replacement parts are always immediately available.

To chop cleaning costs and keep *all* foods moving through your plant, learn more about MOYNO by writing today for Bulletin 34 FE

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*motors, household fans, Propellair industrial fans, hoists; Moyno industrial pumps*
SPRINGFIELD, OHIO • BRANTFORD, ONTARIO

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## NEW EQUIPMENT & SUPPLIES

### Automatic Case Cleaner

New automatic cleaning machine employs vibration and air pressure to "spic-and-span" beverage cases for reuse. Rate: 36 a min.

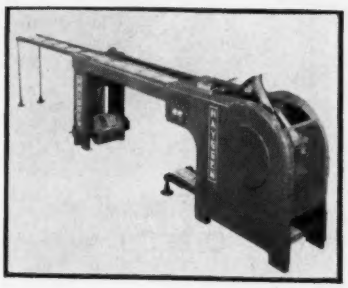
In operation, empty carton-cases enter unit on conveyor and are inverted. Air jets and spring-mounted mechanical shaker-bar then dislodge any particles or objects, which drop into metal container below.

Separators and flaps are held in place until discharge of case from top of unit. Attachment can be added to spray interiors with insecticide.—*Industrial & Automation Div., Radio Corp. of America, 30 Rockefeller Plaza, N. Y. C. 20.*

Circle 316 on Reader Service Card

Sizes for any application.

Fitted in a jiffy.



### Wraps Non-Uniform Items

Horizontal packager, designated the RT, automatically wraps non-uniform products that have commonly been tediously handled manually or semi-mechanically.

Here, says maker, a unique method of forming package permits unit's versatility in wrapping various sizes and shapes.

As material is pulled toward back sealer, film from roll stock is naturally folded over product and it passes under back sealing iron. Finger wheel adjusts for package height.

Product moves on to end sealing bars (positioned on constantly turning drum). Jaws seal bottom of first package and top of second one in single operation. Held in sealing jaws, package follows drum to discharge conveyor.

Completing cycle, jaws accumulate in open position along drum, waiting their turn to resume operations. Drum slips by the resting jaws. Then, on signal from electric-eye control, a set of sealing jaws is released. And as drum moves, upper jaw is cammed down over lower jaw, sealing and cutting at the same time.

Two types of sealing heads are available: Resistance type heaters for regular heat-sealing material, or impulse sealing for unsupported polyethylene or other plastic material.—*Hayssen Mfg. Co., Sheboygan, Wis.*

Circle 318 on Reader Service Card

### Filters for Improved Cleaning of Plant Air

Exceptionally high performance in cleaning air—including trapping and killing of germs—is reported with these new air filters.

The units, available in 300 different sizes and types, are called particularly suitable for vital food-plant applications, as in air conditioners (right photo), heating systems, and the like. It is stated that they assure notable dollar savings through their longer life and improved filtering.

Dirt-retention has been rated as up to 46% better with new filters.

These are permachen-treated units that pioneer dry-filter cellulose acetate fibers formed into loose batts containing millions of dirt traps. Because the filters use no oil, they eliminate problems of cleaning ductwork. And germicidal and fungicidal properties prevent growth of odor-causing bacteria or other organisms.

Maker cites independent laboratory tests as indicating a snaring and killing of 90%-plus of all germs. —*Fram Corp., Providence 16, R. I.*

Circle 317 on Reader Service Card

# GOT A FOOD PROCESSING PROBLEM

## Sunkist technical advisers...over 400 different citrus products for industry...can help you solve it!

SUNKIST KNOW-HOW produces the finest citrus products to be had. That same know-how—the backlog of more than 60 years experience—and those citrus products—over 400 of them—can help solve your food processing problem.

Every course on the American menu has profited from Sunkist research or Exchange products. We've made a good condensed soup glorious by adding a few ounces of Exchange Lemon Juice to *100 gallons* of it. We have stopped pies from "bleeding" by using Exchange Low Methoxyl Pectin in the filling.

And between soup and dessert, we've devised enough manufacturing processes for the benefit of the American food processor to get Sunkist 118 separate U.S. patents!

Sunkist technical experts will be glad to work *with* you—in your own plant—or *for* you—in their own citrus research department. Write—or, if it's urgent, telephone—and a Sunkist man will call on you.

**Sunkist Growers**

Exchange

PRODUCTS SALES DEPARTMENT • ONTARIO, CALIF.

**EXCHANGE BRAND CITRUS PRODUCTS** widely used by leading food processors include: *Lemon Juice...Orange Juice...Orange Oil... Lemon Oil...Frozen Orange Puree...Frozen Lemon Puree... Preserver's Pectin...Low Methoxyl Pectin.*

## Sub-Zero Trailer Reefer

Engine-driven reefer unit newly offered for −0F. hauling is 7½-ton-capacity Super Series Model 220.

Complete installation includes an evaporator (mounted in van nose) and a condenser (fitted under trailer). Latter employs 4-cyl. Hercules engine.

Precision control assures constant temperatures as required—low range setting for frozen products, medium for meats and produce, and high for such goods as bananas.

Maker says that simple design, eliminating belts, brushes, clutches, and slip rings, minimizes maintenance while saving weight. Further cited is unit's speed in pulling down temperature, thus curbing costly delays. — *Transicold Corp.*, 3211 *Hooper Ave., Los Angeles* 11.

Circle 319 on Reader Service Card

## Storage-Saving Lug Folds to Mere 3 In.

With use of this handy, collapsible "Alumi-Lug," important savings are realized in handling, shipping, and storage costs.

Ten-pound working lug (left photo), measuring 12x20½ in. and 12 in. deep, readily collapses (right) to a mere 3 in. height for return shipment or storage. Space of only 37x12x6 ft. then stores 5,000 lugs.

Folding and unfolding is accomplished in quick, simple hand motion.

A larger model—24x17½ in. and 14 in. deep—is also available. Construction is of Kaiser aluminum alloy sheet and rod.—*J. M. Gordon Co., Inc.*, 1740 *Standard Ave., Glendale* 1, *Calif.*

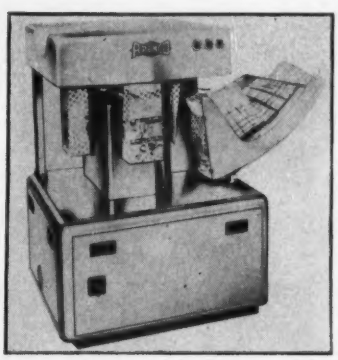
Circle 320 on Reader Service Card

## New Temperature Monitor

Type 701 Limitemp combines magnetic amplifier and transistor circuitry in instrument for monitoring and controlling temperatures within a 100-400F. range.

Accuracy for temperature control is ±3F. of level selected, while that for indication by meter reading is put at ±6F. Integral indicating lamp signals whenever controller is functioning to restore temperature to level desired.—*Westinghouse Electric Corp., Director Systems Dept., 356 Collins Ave., Pittsburgh 6.*

Circle 322 on Reader Service Card



## Feeds & Opens Bags for Fill

This automatic bag feeding and opening unit—the Model VUF—is designed for speedy operations in conjunction with weighing and proportionate filling equipment.

In action, one bag at a time is sucked from storage magazine (right in photo), then opened and fixed at Station 1.

There follows movement of bag to Station 2 (front), where bag's bottom is completely opened by compressed air. Finally comes the turn to Station 3 (left), where filling proceeds.

Output ranges to 35 fills a min. Magazine holds some 300 bags, including such types as SOS, satchel bottom, gusseted square bags, and flat bags.—*Arenco Machine Co., 25 W. 43rd St., NYC 36.*

Circle 321 on Reader Service Card

## Secondary Level Indicator

Readings from a primary unit, located anywhere in the plant, are duplicated by this new miniature secondary liquid-level indicator.

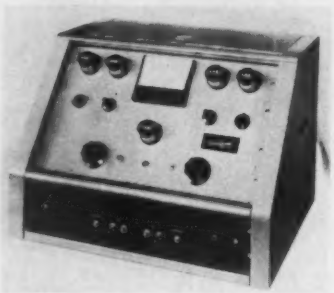
Outstanding feature in 'quarter-sized' instrument is substitution of a transistorized amplifier in place of the vacuum tube used in the primary.

Weight of new unit is 5 lb. Face dimensions: 2½ in. wide by 6 in. high.—*Yarnall-Waring Co., Phila.*

Circle 323 on Reader Service Card

## Want More Information?

**It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one at the bottom of each item) on the handy Reader Service Postcard—back of book. Then sign your name and address and mail.**



## Chromatography Speeder

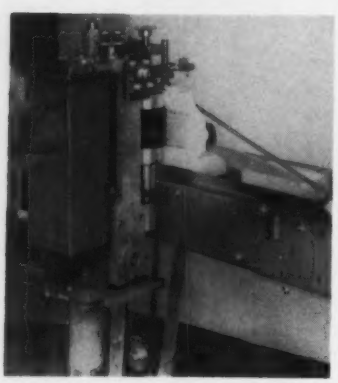
Specifically developed to speed gas chromatography analyses, this new analog Computagram is designed to complete calculations on chromatograms in less than 3 min., with accuracy within 0.1%.

After correcting chromatogram peak areas and heights for differences in response of detector, unit normalizes to total 100, thereby giving percent (mole or weight according to correction factors inserted) of each individual component.

Instrument pictured computes for simple mixtures running to four components. Available are two other models to handle up to 8 and 12 components, respectively.

While unit may be employed with any GC equipment, it is particularly recommended for use with maker's Chromacon.—*Podbielniak, Inc., 341 E. Ohio St., Chicago, Ill.*

Circle 324 on Reader Service Card



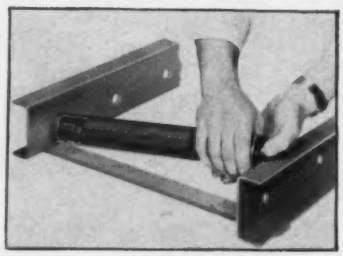
## Cartons Printed as Formed

With use of special Flexographic-process imprinting attachment (supplied by Adolph Gottscho, Inc.), copy now goes directly on cartons as they are set up by Kliklok equipment (Models KF5, KF-12, KF5-12, and KF). And line drawings may be included with text.

System enables printing of recipes, cooking instructions, and messages, premium offers, code numbers, brand identification, etc., as called for in working run, without need for maintaining inventories of pre-prints.

Printing unit is placed at filler infeed conveyor section of setup machine. Impressions go on unwaxed tops of Crownline waxed cartons, thus there is no smearing.—*Crown Zellerbach Corp., Western-Waxide Div., 2101 Williams St., San Leandro, Calif.*

Circle 325 on Reader Service Card



## Handier Spring-Axle Roller

New A-F rollers for conveyor units feature the special spring-retained axle (revealed in photo by cutaway). Thus permitted is easy mounting and removal of individual rollers from frame. And as shown, no special tool is needed for placement.

Now furnished by conveyor maker as standard, rollers come in 1⅞, 2¼, and 2½-in. dia. Load capacity is rated at approximately 150-250 lb. per roller.—*The Alvey-Ferguson Co., 3327 Disney St., Cincinnati 9.*

Circle 326 on Reader Service Card

## Line-Feed Infra-Red Oven

Streamlined product-conveying belt moving under new T-3 quartz lamps is operating design feature of new pilot model infra-red oven.

Reported are savings of both time and space in high quality baking.

Unit's top is lifted in photo to show bank of quartz lamps, which reach 4,000F. filament temperature. —*The Fostoria Pressed Steel Corp., Fostoria, Ohio.*

Circle 327 on Reader Service Card

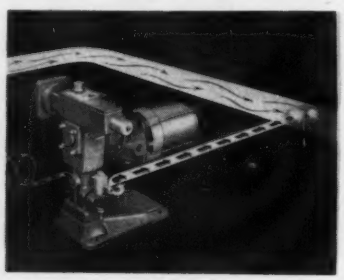
## High-Rate Patty Former

This 4-head patty forming machine is designed to mould meat, fish, and potato items at rates of 7,500-plus units per hour. Maker says that but one man is needed for its operation.

Incorporated are feed rollers, compression chamber, and reciprocating patty-knockout die plate. Latter may be specified for sizes and shapes (round, square, oval, chopette) as desired.

Also available is top and bottom cubing attachment.—*E. W. Bridge, Jr., Palmyra, N. J.*

Circle 328 on Reader Service Card



## Versatile Metering Pump

Called the Pneumatic Stroke Controlled McCannameter, new automatic metering pump proportions chemicals (as additives) to any main line flow.

Combination photo-and-diagram illustrates operation.

Acting on 3-15 psig. air signal, constant-discharge unit, requires no additional air power, responds directly to eliminate backflash.—*Hills-McCanna Co., 4600 W. Touhy Ave., Chicago 46.*

Circle 329 on Reader Service Card



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*from* *OLIN MATHIESON*

## a whole family of kraft packages for shipping, selling!

Now Olin Mathieson offers complete kraft packaging service —Cartons, Containers, Bags and Sacks—all the way from your door to the consumer's. Contact the Olin Mathieson kraft packaging team today: let them show you how superior raw materials, better package design, and new Olin Mathieson packaging developments can help you save more, sell more! Packaging Division, W. Monroe, Louisiana.

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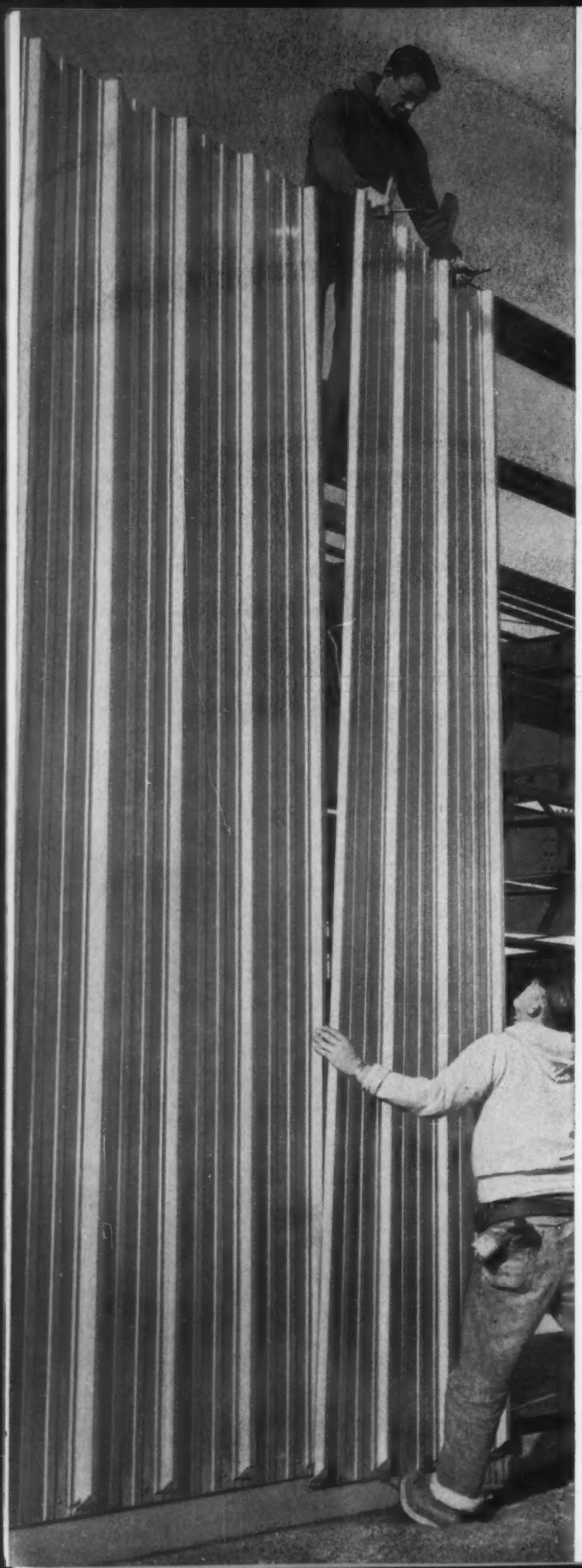

# *New* **Butlerib**™ *panels create the*

# BOLD AND BEAUTIFUL LOOK

## *for Butler buildings*

Butlerib—a bold new metal building panel—so beautiful, you'd expect to find it only on expensive custom-fabricated structures.

Butlerib's unique combination of deep and shallow corrugations creates pleasing shadows . . . gives industrial and commercial buildings a substantial, distinctive appearance. Yet, it's the new standard cover on Butler buildings—the lowest-cost way to build well.

Butlerib's new corrugated pattern creates a stronger, more rigid panel. This means there's less deflection under wind and snow loads . . . joints *stay* tight. The result—the strongest . . . most weathertight cover ever offered as standard construction on any pre-engineered buildings.

Butlerib roofs give maximum protection, yet never require re-roofing, re-waterproofing, or other costly maintenance procedures.

A full 3 feet wide, in lengths up to 32 feet, Butlerib panels make short work of covering even the largest Butler buildings.

Now... more than ever before—Butler is the fastest... lowest-cost way to build well. Butler pre-engineering and factory fabrication cuts weeks—even months—from costly building schedules. This puts you in business, earning profits, far sooner than slow, traditional or ordinary building methods.

Get the full story of the Butler system of building from your nearby Butler Builder. Ask him about Butler financing too. He's listed in the Yellow Pages under "Buildings" or "Steel Buildings." Or, write directly to us.

*Patent Nos. D178605; D178659

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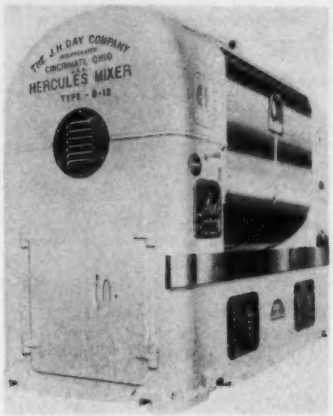
CIRCLE 106 ON READER SERVICE CARD




### Advanced-Control Mixer

Interchangeable agitator roller arms, designed for improved mixing-time control to compensate for variations in flour, formulas, etc., are incorporated in this Hercules B-12 dough mixer.

The new arms may speedily be changed from one diameter size to the next as needed to maintain mixing schedules.

Further, a new water jacket compels coolant to reach 100% of tank sheet surface. Thus, possibility of 'hot spots' is precluded.—*J. H. Day Co., Div. of Cleveland Automatic Mach. Co., Cincinnati 12.*

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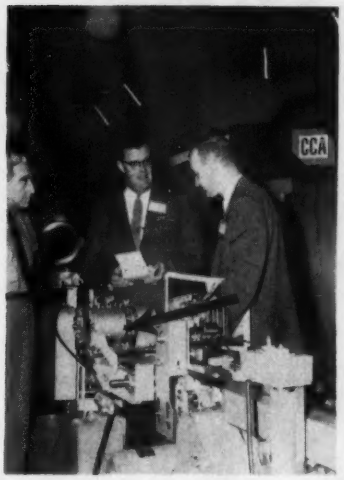


### Spreads Cartoned Product

Packaging operations are streamlined with use of this new unit that uniformly spreads carton-packed products.

Spreading action is accomplished by passage of filled cartons under special roller-type compression device (arrow). Plow and rotary-finger units then close the carton flaps.

Leak-proof cold-wax or foil-laminate containers are employed.—*Container Corp. of America, 38 S. Dearborn St., Chicago 3.*

Circle 331 on Reader Service Card

## INGREDIENTS

**Wheat Gluten Additive,** Vicrum, is now going to bakers (see FE May, p. 23) for use as protein complement of flours. It's light tan powder stated to improve dough strength, producing breads with superior volume, grain, and crumb. Product is available in 100-lb. bags.—*Huron Milling Div., Hercules Powder Co., Inc., Wilmington 99, Dela.* (332)

**Free-Flow Anti-Humid Starch** has been specially developed for use in bread bakeries' pneumatic dusting systems. Named "Sta-Matic," product is stated to promote tenderer, better-color crusts. Further, it won't support insect life.—*A. E. Staley Mfg. Co., Decatur, Ill.* (333)

**Cook-Chex takes the last trace of guesswork out of production control.**

1. Eliminate wrong cook schedules.
2. Keep retort baskets in sequence.
3. Guard against "by-passing" retorts.
4. Provide low-cost permanent records for your cooking-plant.

Cook-Chex is the chemically impregnated retort tag that changes from purple to green *only* after your run has been properly and completely retort processed. Hang a Cook-Chex on each basket before retorting—inspect it after withdrawing. You have the full "protection" record at a glance. It's that easy—that sure.

Used by *all* major packers. Approved and recommended by cannery inspectors. Ask *them!*

*Send for Free samples.*

**ASEPTIC-THERMO INDICATOR CO.**
DEPT. FE-7
1471 Vanowen St., North Hollywood, California

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Prompt service to belt users is assured by two factories, one in the Middle West and one on the Pacific Coast.

**Cyclone Fence Dept.**
**American Steel & Wire**
**Division of**
**United States Steel**

USS

Manufactured at Waukegan, Ill. and Oakland, Calif.
Sales Offices, Coast to Coast

**CY BELT says**

"I can eliminate 'time lag' and speed production!"

Too often material in process can go only so far, and then must wait until somebody carries or pushes it to the next stage in the production line. The delay caused by the need for manual handling can frequently be eliminated by a *complete* conveyor system that reduces manual handling to the absolute minimum. Time is saved, unit costs are reduced, and the profit margin is widened. A trained Cyclone salesman can analyze your present materials-handling system to uncover time-wasting procedures, and suggest improvements. His analysis costs nothing, and his recommendation will be tailored to *your* plant and *your* needs. Just fill in the coupon.

*USS and Cyclone are registered trademarks*

USS **Cyclone Metal Conveyor Belts**
Spiral Woven · Flat Wire · Flex-Grid

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Dept. H79, 614 Superior Avenue, N.W.
Cleveland 13, Ohio

Please send me, without obligation, your catalog No. 5 on Cyclone Processing Belts.

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Company.....
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## NO SALARY REQUIRED!

- **Years of practical experience in solving food production problems!**
- **Can help with your vitamin enrichment and fortification procedures**
- **Offers unlimited supply of vanillin**
- **Know-how of years of leadership in color field**

THIS FOOD SPECIALIST is a Sterwin Technically-Trained Representative . . . an expert with technical and practical experience to help you produce better food products more easily and economically.

He's cut time, expense, production steps in dozens of cases . . . is relied on by food manufacturers (large, medium, small) for prompt solutions to color, vitamin, vanillin and other food ingredient problems.

For a new production set-up, or to improve an existing one . . . see your local Sterwin Representative . . . costs you nothing . . . can save you plenty.

*Sterwin Chemicals* INC.

Subsidiary of Sterling Drug Inc

**1450 Broadway, New York 18, N.Y.**

## NEW SUPPLIES

**Non-Skid Floor Finish,** newly marketed, incorporates abrasive grit for sure footings under even wet or oily conditions. Application is by brush or trowel over either concrete, wood, or metal floors. Product is available in light gray, dark gray, or tile red.—*Lewbill Industries, Inc., 2002 Clark Bldg., Pittsburgh.* (334)

**Aerosol Belt Dressing,** called Sprazon, is readily and safely "misted" onto moving rubber, fabric, or leather belts. Running pulley action transfers film to inner surfaces. Spray application makes for uniform, economical dressings.—*Graton & Knight Co., Worcester, Mass.* (335)

**Sheet-Form Flooring** claimed to outwear concrete is attractive black Nu-Flor. It's sold in "ready to lay" 2x3-ft. sections, ¼-in. thick. Manufacturer says resulting surface is quiet, sanitary, odorless, and won't chip or crack.—*The Monroe Co., Inc., 10703 Quebec Ave., Cleveland.* (336)

**Lube Advance** is reported through new triple filtration in preparation of Orange Solid Oil. Maker declares that resulting lighter, clearer product has improved sealing, waterproofing, and rust-protection properties.—*Famous Lubricants, Inc., 124 W. 47th St., Chicago 9.* (337)

**All-Nylon Strainers** are announced for basic clarifying of emulsions, suspensions, and like food-product batches. Offered in bag form (sizes 18x28 in. and 13x15 in., with choice of 20, 40, or 80 mesh), they are suitable for both gravity and pump operations. Further use is in prepassing materials before fine cartridge-type straining.—*Fast-Flo Corp., 1707 Kings Highway, B'klyn, N. Y.* (338)

**Improved Plastic Tubing,** Flexite NT-903, is offered for food processing applications. Extruded from clear, non-toxic vinyl polymer formulation, it comes in range of sizes and wall thicknesses.—*L. Frank Markel & Sons, Norristown, Pa.* (339)

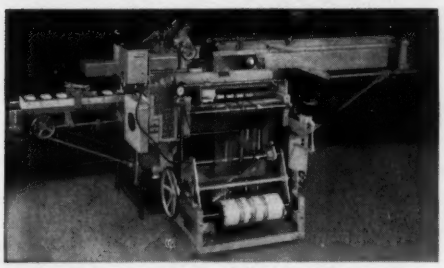
## BRIEFS

"**Snooperscope**" is available for use in after-hour plant-security surveillance where it's necessary to watch over dark premises without being seen. It's Navy-developed night observation glass having image tube that converts invisible infra-red light to visible light.—*Edmund Scientific Co., Barrington, N. J.* (340)

**Upping of Line Speeds on Sealamatic "85"**—to 120 bottles a minute—is announced by maker. Unit applies cellulose neck bands, handling "anything from vials to gallon jugs." *Gisholt Machine Co., Madison 10, Wis.* (341)

**3-D Motion Screen Separator,** known as the Syncro-Matic, is now available nationally. Unit (initially developed by State Steel Products, Inc.) has turned in top performance in grading diced vegetables, fruits, and nuts, and in screening suspensions such as fishstick water. Rights to make, sell, and service machines have now been contracted by—*The De Laval Separator Co., P'keepsie, N. Y.* (342)

**Anti-Condensation Fan** is designed for mounting in outdoor storage structure to maintain condition of bulk goods. Compact, self-contained unit keeps ambient air circulating over materials. Fan is turned at 3,450 rpm. by enclosed 1-hp. motor. —*Sprout, Waldron & Co., 130 Logan St., Muncy, Pa.* (343)

**NOW YOU CAN HAVE TOMORROW'S OVER-WRAPPING MACHINE TODAY!** Battle Creek's completely new Model 475 successfully handles more than 40 different formulations of soft plastic film . . . your assurance new plastic film developments will not outdate this machine. Change of films requires only electronic heat adjustment. Size changes are made in 15 minutes. Wraps up to 75 per minute within 5" to 12" lengths, 3" to 8½" widths and ¼" to 4" heights. Choose any of these films — polyethylene (medium, low and high density 1 mil and up), polystyrenes, heat sealing cellulose acetates, heat sealing foils, polyvinyl chlorides, cellophanes, polypropylenes or polymer coated films. **Battle Creek *"Continuous Flow"* Packaging Machines, Inc., Battle Creek, Michigan.**

**Paperlynen Caps are ADJUSTABLE to any headsize. Insure perfect fit. Light and comfortable. More ECONOMICAL. Reduce your present Cap expense by 50%. Distinctive with your special imprint. Millions used annually by nationally known companies. Just mail coupon below with manager's signature and we will send you absolutely FREE, a Patented Adjustable Paperlynen Service Cap.**

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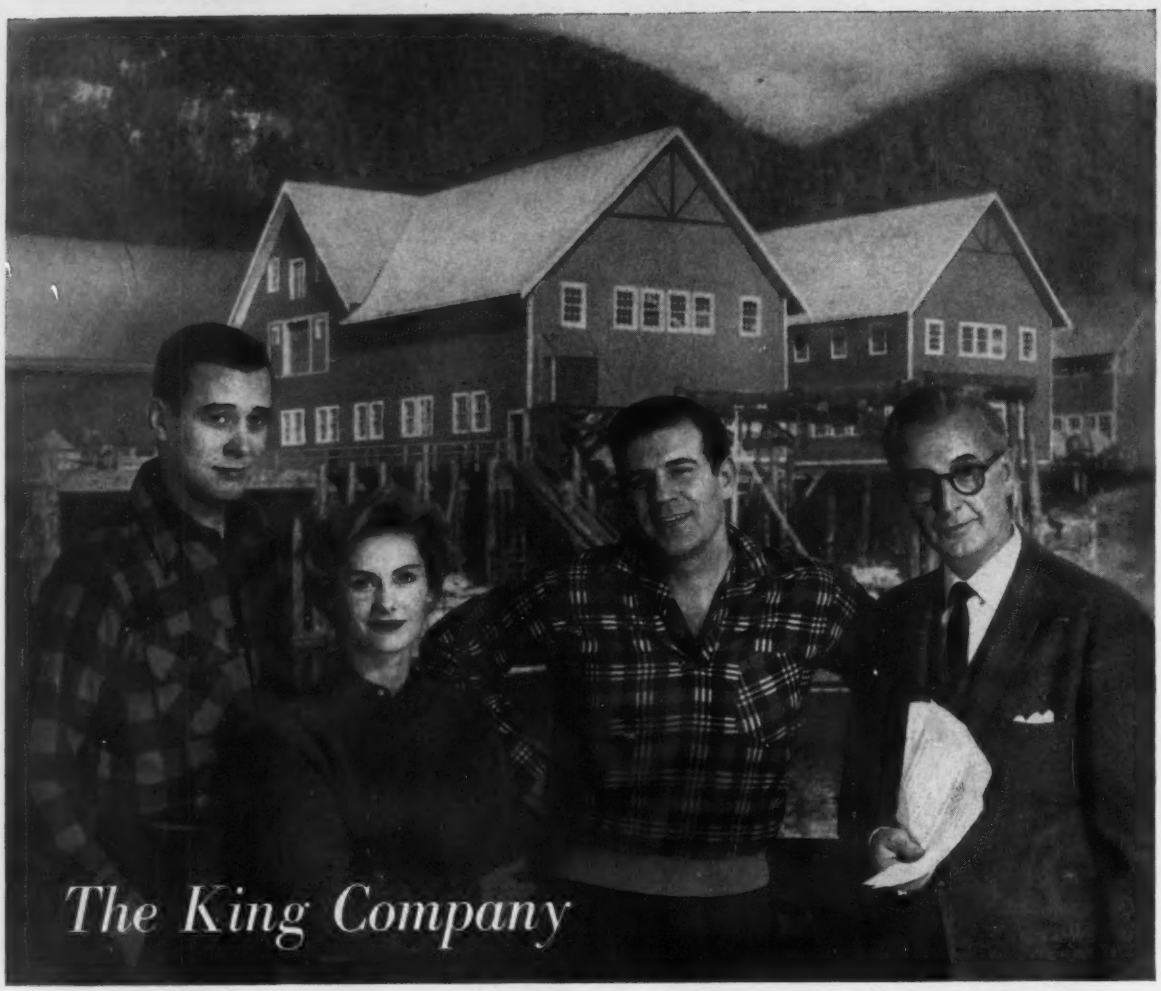
CIRCLE 109 ON READER SERVICE CARD




# *buys a packaged plan for the future*

**. . . with the help of the Ætna Life's Business Planning Department**

The King Processing Company is a close corporation packaging frozen sea foods. The stock of the company is held by President Herbert F. King and members of his family. They operate the business.

Recently a member of the local Ætna Life Business Planning Department explained how death of a principal stockholder can create major problems. His heirs may be forced to unload a substantial block of stock to pay death taxes, thus watering down their control of the corporation. With the help of their Ætna Life representative, attorney and accountant, a plan was developed to avoid this danger by taking advantage of certain favorable tax legislation designed for just such a situation.

If you own or operate any kind of business, it will pay you to investigate the vital need for a business continuation plan — and no one is better equipped to serve your interests than the Business Planning Department of your local Ætna Life General Agency.

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110 CIRCLE 110 ON READER SERVICE CARD

CIRCLE 111 ON READER SERVICE CARD →

# *Are your $2/hr. men waiting for 30¢/hr. equipment?*

It actually may cost *you* less than 30¢ an hour to own and operate a Clark Powrworker®. In arriving at our figure we included such "extras" as cost of charging equipment, 6% interest on the money you have invested in the equipment, an additional 2% interest as a miscellaneous expense, even the cost of current to recharge batteries. This was all over and above the normal charges of: cost of truck, depreciation, insurance, taxes, and freight.

But even at this "high" figure of 30¢ per hour . . . can you afford to keep manpower waiting for lack of sufficient equipment? In pure economics, it makes good sense to give your men the trucks they need . . . especially since it costs so little to own and operate a Clark Powrworker. Possibly, our headline should have read: "*Give every man his own truck!*" Startling? True. But we can show you figures to prove that this bold action is highly profitable.

Surely worth investigating. Send for the 16-page Powrworker booklet. We'll include the name and phone of a local representative who can review our figures with you in detail. Write or wire: Powrworker, Clark Equipment Company, Battle Creek, Michigan.

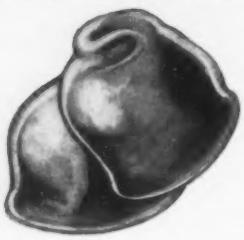
**CLARK® EQUIPMENT**

ed in U. S. A.

# CREME DE RHUM

*New!*

**FLAVOR No. 29718**



## ....IT PASSED THIS CRUCIAL TEST

CHOCOLATE COATED CREAMS flavored with this new taste specialty made their debut recently at the Institute of Food Technologists Convention. In presenting CREME DE RHUM and other FRITZSCHE flavors at this annual gathering of industry experts, we sought both professional and public reaction to our offerings. CREME DE RHUM passed this crucial test with flying colors. Those who tasted it in the finished goods found this finely balanced butter-rum combination somewhat different from the usual butter-like formulations and strikingly reminiscent of certain popular colonial delicacies. In addition to its use in confections for *cream fondants, toffees and hard candies,* it is also suggested for *frozen desserts, puddings, Nesselrodes, cake icings, etc.* A delicious flavor . . . we hope you'll try it!

**FRITZSCHE BROTHERS, Inc.**

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76 NINTH AVENUE NEW YORK 11, N. Y.

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It makes good sense to give your men the trucks

Creek, Michigan.

# JUST OFF THE PRESS

## PLANT ENGINEERING

**Condensers.** Shows installations of firm's evaporative-type equipment, and cites advantages. 4p.—Frick Co., Waynesboro, Pa. (388)

**Welding Fittings.** Dimensional and engineering data, drawings, and photos of lightweight stainless steel products. 20p.—G & H Products Corp., Kenosha, Wis. (389)

**Clutch-Pulley Package.** Describes sheave for quick, easy mounting on any standard NEMA motor shaft. 10p.—Warner Electric Brake & Clutch Co., Beloit, Wis. (390)

**Engines.** Pinpoints design features and cites advantages of "rugged-work" unit. 7p. — Allis-Chalmers Mfg. Co., Milwaukee, Wis. (391)

**Multi-Conductor Cable.** Describes new polyvinyl-insulated type for installing 6 to 56 pairs of thermocouple leads. 4p.—Thermo Electric Co., Inc., Saddle Brook. N.J. (392)

**Plate Magnets.** Selection data on models for existing chutes, ducts, conveyors, or other handling equipment. 4p.—Stearns Magnetic Products, Milwaukee. (393)

**Adjustable Speed Drives.** Condensed specifications on new line, $\frac{1}{16}$-10 h.p. 2p.—Cleveland Machine Controls, Cleveland. (394)

**Self-Aligning Roller Bearings.** Details design, specifications, lubrication, seals, and installation features.—Chain Belt Co., Milwaukee. (395)

**Solution Feed Pump.** Features life-time-guaranteed diaphragm. 2p.—Fischer & Porter Co., Hatboro, Pa. (396)

**Motion Indicator.** Tells how to install and check rotating shaft "guard" for typical installations such as elevators, feeders, belt conveyors. 4p.—Bin-Dicator Co., Detroit. (397)

**Gear Pumps.** Details construction, dimensions, and driving power requirements of units for pumping liquids with lubricating qualities. 4p.—Schutte & Koerting Co., Cornwells H'ts., Pa. (398)

**Water Treating.** Presents latest types, and basic operating principles of manual and automatic zeolite softeners, demineralizers and deionizers, dealkalizers, ion exchangers, filters, purifiers, aerators, and degasers. 24p.—Elgin Softener Corp., Elgin, Ill. (399)

**Check Valves.** Specifications on firm's line for controlling chemical and gaseous fluids, also bronze, iron, and steel valves for boiler feed lines. 2p.—Lunkenheimer Co., Cincinnati (400)

**Power Transmission Machinery.** Reviews firm's line, and details two new products—dry fluid drives and flexible cushion couplings. 8p.—Dodge Mfg. Corp., Mishawaka, Ind. (401)

**Compressors.** Run-down on vital components of 8 sizes of air-cooled models in 15-125 hp., 81-641 cfm. range. 16p.—Joy Mfg. Co., Pittsburgh. (402)

## PROCESSING

**Food Processing.** New catalog covers supplier's complete line. Details on such equipment as heat exchangers, homogenizers, conveyors, fittings, accessories, etc.—Cherry-Burrell Corp., Cedar Rapids, Ia. (403)

**Centrifugal Separators.** Describes design, operation, and advantages of models for 5 basic liquids-solids applications. Features new high-capacity unit with redesigned rotor and feed passages. 16p. — Dorr-Oliver, Stamford, Conn. (404)

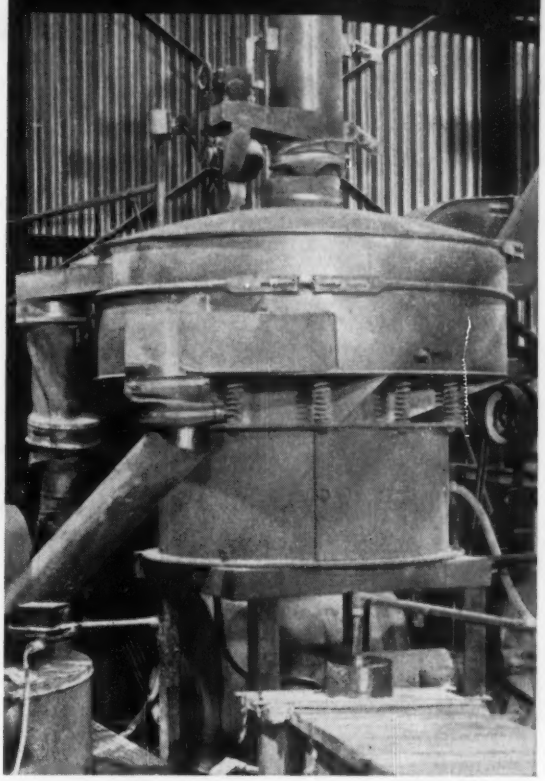
**Brewing.** Report on technological advances made since re-legalization in 1933. Discusses beer processing, and equipment, bacteriology, etc. Lists books published on subject in past 25 yr. 50p.—Schwarz Laboratories, Mt. Vernon, N. Y. (405)

**Sausage Linker.** Describes attachment for patty machine.—Needham Mfg. Co., Inc., Needham H'ts., Mass. (406)

**Nozzle.** Describes new item said to have anti-drain valve for instantaneous shut-off.—Scully Signal Co., Melrose, Mass. (442)

**Rotary Processing Equipment.** Describes standard dryers, kilns, coolers for food and allied industries. Includes photos, interior views, engineering graphs, other


*Dry milk screened at 3000 lbs. per hr.*



A single SWECO Separator at H.P. Hood & Sons, St. Albans, Vermont, screens instant non-fat dry milk powder to exact size, at 3000 lbs./hr. – without blinding.

Non-fat dry milk powders must be of exact size to insure instant and uniform solubility.

H. P. Hood & Sons rely on a 48" diameter stainless steel SWECO Separator, with a 50 mesh stainless steel screen cloth, to deliver uniform particle size... fast, without bothersome screen blinding.

The SWECO Separator is quiet, dust-tight; easy to clean; meets food industry sanitary requirements.

*If you have a screening problem, write for a test demonstration in your plant, on your own material. Or send for new 20-page catalog and screening data on your specific material.*

*Write Dept. S-308-33*

SWECO

**Southwestern Engineering Company**
4800 Santa Fe Avenue, Los Angeles 58, California
*Engineers–Constructors–Manufacturers*

SEPARATORS FOR THE FOOD INDUSTRY

CIRCLE 113 ON READER SERVICE CARD 113

*You can't tell me there's anything really different about*

**King Sharp Freeze Systems**

Many a buyer has taken this attitude in our first meeting. We like to give him these facts . . . then he can decide for himself:

1. King Systems are guaranteed to perform to their ratings.
2. Our customers report lower operating costs on King units alongside of other makes in the same plants.
3. King Systems feature fast, economical air defrost.
4. King units can be serviced while warm, during defrosting. Maintenance is clean, comfortable, simple.
5. All installations are individually engineered by competent specialists.
6. Air circulation maintains even temperatures and air turbulence throughout room, free of blasts on box men, providing fastest possible freezing.
7. King Co. has a 50 year reputation of service and guarantee of performance to its thousands of customers.

Wouldn't you like to talk to the people that really know their business.

*Write for* King *free technical bulletin.*

SHARP FREEZE SYSTEMS

King COMPANY OF OWATONNA

905 North Cedar Street
Owatonna-Minnesota


aids in drying and cooling calculations. 28p.—Standard Steel Corp., Los Angeles. (407)

**Pasteurization system.** Details advantages of continuous ultra high ice cream mix process, with drawing of typical system and explanation of operation.—Creamery Package Mfg. Co., Chicago. (408)

**Sanitary Check Valve** with 1-piece cast Strataloy body, taper-type poppet of Neoprene-base material. Available in ¾, 1, 1¼ pipe sizes —Strataflo Products, Ft. Wayne, Ind. (409)

**Heat Exchanger.** Describes unit specifically designed for ultra-high heating, ultra-low cooling, or both. 6p.—Cherry-Burrell Corp., Cedar Rapids, Ia. (410)

**Syrup-Making.** Step-by-step methods for minimum investment and in small space. Lists simple equipment needed, and shows diagram of typical room set-up.—V. & E. Kohnstamm, Inc., N.Y.C. (411)

## PACKAGING

**Pressure Sensitive Labels.** covers firm's made-to-order line for trademarking, color coding, food packages. Details labeling equipment. 8p. —Avery Label Co., Monrovia, Calif. (412)

**Labeling Machine.** Details automatic model that features newly designed glue label pickup, simplified pressure stations. 4p—MRM Co., Inc., Brooklyn, N. Y. (413)

**Packaging Guide.** Covers basic and special corrugated box designs. Detailed exposition of 56 styles developed for specialized product and marketing requirements. 32p. — Hinde & Dauch, Sandusky, Ohio. (414)

**Cook-In Pouch.** Describes four major types, details kitchen ease features, gives technical tips to prospective packers. 4p. — Continental Can Co., Mt. Vernon, Ohio. (415)

**Cellophane Bundling.** Spells out advantages over bulky opaque wrapping materials. 12p. — American Viscose Corp., Philadelphia. (416).

**Aluminum Cans.** Catalogs 335 standard stock sizes in dia. from ⅛-25 in., heights to customers' requirements. 8p. — American Aluminum Co., Mountainside, N. J. (417)

**Shipment Marking, Sealing Guide.** Details stenciling for safe delivery, gummed-tape savings, proper kind of ink. Includes conversion tables for weights and measures, export marking data, and scale. 24p.—Marsh Stencil Machine Co., Belleville, Ill. (418)

**Heat Sealer.** Data on bench-type, foot-operated unit that handles sealable thermoplastic materials.—Product Packaging Engineering, Culver City, Calif. (419)

## QUALITY CONTROL

**Tissue Culture Apparatus.** Covers grinder for soft or tough materials, pestle homogenizer, flasks, pipettes, etc. 12p.—Kontes Glass Co., Vineland, N. J. (420)

**Sterile Water.** Gives features of system utilizing boiler steam. 8p.—Wilmot Castle Co., Rochester, N.Y. (421)

**Electronic Equipment.** Describes instruments for process monitoring of color, turbidity, fine dust loadings, etc. —Photomation, Inc., Bergenfield, N. J. (422)

**Chromatography.** Describes over 134 instruments and accessories for gas and bapor analysis. Includes introduction to chromatography, describes firm's flow system, reviews temperature programming. 52p.—Burrell Corp., Pittsburgh, Pa. (423)

## INSTRUMENTS

**Pump Recirculation.** Describes control system to maintain safe, adequate flow at all times. 2p.—Bailey Meter Co., Cleveland,. (424)

**Flame Safeguard.** Covers construction, operations, and applications of new self-checking unit. 2p.—Minneapolis-Honeywell Reg. Co., Philadelphia. (425)

**Flow Rate Transmitters** detailed. 12p.—Brooks Rotameter Co., Lansdale, Pa. (426)

**Process Control Systems.** Catalog and manual emphasizes testing and calibration of systems using proportional currents for signal transmissions and telemetering. Includes specifications

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for 3 newest types, application data, diagram for interconnecting instruments. 16p. —Technique Associates, Inc., Indianapolis. (427)

**Electronic Thermometer** for determining temperatures at various depths in fruit, fish. meat also inside autoclaves and retorts. 2p.—Atkins Technical Inc., Cleveland (428)

## INGREDIENTS

**Vitamin.** Reprint of graduate thesis on role of $B_{12}$ in nucleic acid metabolism.—American Meat Institute Foundation, Chicago. (429)

**Essential Oils.** Tells of advances made in research on production of synthetics, and suggests tremendous advantages in control of quality and uniformity, avoidance of fluctuations in price and uncertainties of supply.—Fritzsche Bros., Inc., N.Y.C. (430)

## SANITATION & MAINTENANCE

**Floor Machine.** Gives advantages and specifications of lightweight model. 2p.—Multi-Clean Products, St. Paul, Minn. (431)

**Insecticide Fogging.** Data, cost comparisons, quotes from users, on thermal aerosol machine that dispenses dry fog, harmless to humans and warm-blooded animals.—Aero-Master, Inc., St. Louis. (432)

**Case Cleaner.** Details operation, capacity, air-consumption, and floor space required. — Climax Products Div., Lodge & Shipley Co., Cincinnati. (433)

**Sanitary Paint.** Introduces product, formulated specifically for use in food plants, with new pigment that kills mold organisms on contact. 4p.—Cook Paint & Varnish Co., Kansas City, Mo. (434)

**Maintenance Program.** How systems engineering techniques can be applied to specific sanitary maintenance requirements, also organizes custodial work, sets up automatic controls, and provides for follow-up. 20p.—Puritan Chemical Co., Atlanta, Ga. (435)

**Solid Film Lubricant.** Technical data and usage procedure. 4p.—Electrofilm, Inc., N. Hollywood, Calif. (436)

## MATERIALS HANDLING

**Training Film.**—Puts across points that will help prevent material handling accidents. —National Safety Council, Chicago. (437)

**Carton Clamps** for attachment to any make or model of lift truck.—Little Giant Products, Inc., Peoria, Ill. (438)

**M. H. Equipment.** Illustrates and describes firm's complete line, such as cargo containers, conveyor guards and pallets. Includes selection chart. 6p.—Tri-State Eng. Co., Washington, Pa. (439)

## MANAGEMENT

**Display Stands.** Manufacturers' guide to selection. Answers questions on how stands can introduce a new product, tie in with national advertising, sales themes and promotions, for plus sales. Photos of more than 30 effective displays. 36p.—Hinde & Dauch, Sandusky, Ohio. (440)

**Paper.** Color photos dramatize varied roles with examples of products that withstand fire, shield radar warning installations, etc. Gives practical ideas for imaginative use, and shows firm's facilities and items in production and use. 36p.—Mead Corp., Dayton, Ohio. (441)


# dripless bottle

A dripless bottle pays off in return sales. It also pays off in quick acceptance of other members of the product "family." Take these Crosse & Blackwell products. They help to sell each other—and dripless pouring rings do an important part of the job. Consider WS clear polyethylene pouring rings for your product—or your family of products. Stock sizes: 28 MM/400, 410, 415 series; 38 MM/414 series.

**Wheeling makes polyethylene liquid dispensers, snap-on shaker tops, molded caps, metal tubes, and many interesting specialty items.**

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WHEELING STAMPING CO.
WHEELING W. VA

CIRCLE 115 ON READER SERVICE CARD



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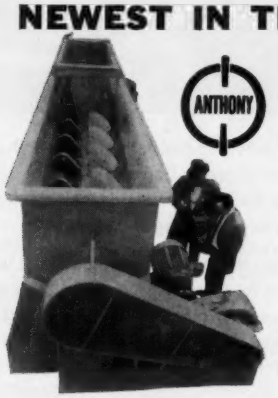


**is this giant 34,000 pound sugar mingler which will process 100 tons per hour.**

**Anthony specializes in engineered continuous mixing applications for all solid and semi-solid food products.**

**Capacities of our standard mixers range from a few hundred pounds per hour to as much as one hundred tons per hour.**

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CIRCLE 231 ON READER SERVICE CARD

# 63 NEW* FOOD PROCESSORS

## HAVE JUST BEGUN TO TAP THE OPPORTUNITY WAITING IN NORTH CAROLINA

Sixty-three food operations ranging in size from the small community factory to such leaders as Swift, Armour and Gerber began last year in North Carolina — the state that ranks

First in farm population

Second in production of peanuts, sweet potatoes and broilers

Tremendous in potential for quality fruits, vegetables, poultry and livestock.

Food processors find in North Carolina and the surrounding southeastern area one of the fastest growing markets in the nation. Too, a changing farm pattern in North Carolina is releasing manpower that transfers easily and efficiently from producing to processing farm crops.

You will find these farm-based men and women cooperative in keeping production smooth and profitable in your plant. They believe that profit where they work is good for them, too. For prompt and confidential site information contact Wm. P. Saunders, Director, Department of Conservation and Development, Raleigh, North Carolina.

*New and expanded plants during the calendar year 1958

# USEFUL NEW BOOKS

## Whither Those Stamps?

TRADING STAMP PRACTICE AND PRICING POLICY. *Edited by Albert Haring and Wallace Yoder. Published by Indiana University, Bloomington, Ind.* 1959. 390 *pp. Price:* $6.

The impact made in American business by the innovation of the promotional device known as the trading stamp cannot be argued. Believing that the half-billion dollar stamp industry is here to stay, the authors explore favorable and unfavorable influences.

The book is a compilation of a lengthy, impartial study aimed at shedding light on the controversial areas of trading stamps. Food men will be interested in the merchandising factors thus spotlighted.

## Packaging Bibliography

PACKAGING RESEARCH INVENTORY (*Research Study* 37), *by Spencer A. Larsen. Published by American Management Assn., 1515 Broadway, New York City* 36. 1959. 207 *pp. Price:* $6. ($4 *to AMA members*).

In today's competitive market, executives in marketing, manufacturing, and research in the food industry must be constantly alert to the latest packaging trends and techniques.

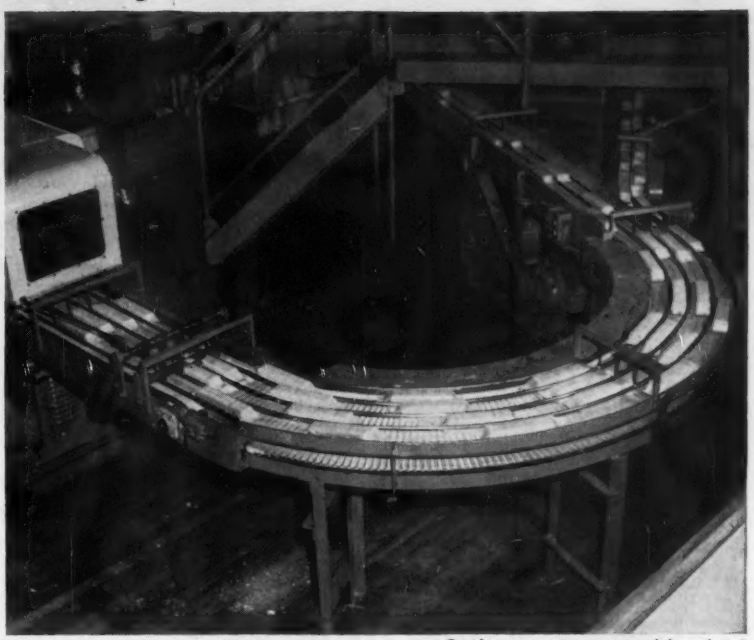
Prepared under the direction of the AMA Packaging Division Exhibitors' Advisory Committee, this study offers a comprehensive, classified inventory of printed materials reflecting packaging research. It also includes a survey of the packaging research needs and the goals of packagers and suppliers.

## New Refrigeration Reference

HEATING, VENTILATING, AIR CONDITIONING GUIDE 1959. *Published by American Society of Heating and Air Conditioning Engineers, 62 Worth St., New York City* 13. 1959. 1288 *pp. Price:* $12.

This 37th edition of a standard reference has been enlarged to an 8½ x 11 in. page size to provide additional space for new technical data. It is comprised of a 768-page technical data section, and a 461-page catalog data section. Bound within the back cover is the society's Psychrometric Chart.

# Industry Moves

Crackers turn corners on an Ashworth Belt

## on Metal Process Belts by ASHWORTH

Every industry has its product flow problem; frequently, it's one of "getting around a corner". Around the corner or straightline travel . . . whether it's crackers, popcorn, candy or nuts and bolts . . . there's an Ashworth Metal Process Belt to solve the problem.

Fabricated from any metal capable of being formed into wire, Ashworth belts provide a conveying medium permitting processing in transit through temperatures from −50° to 2100° F. Wherever your product must go—Ashworth Belts will help you effect economies and . . . keep your product on the move.

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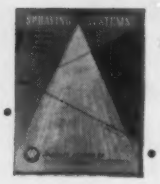
**SPRAY NOZZLE**
*problem?*

*perhaps one of our* **DATA SHEETS** *can suggest a solution*

For almost every spraying application, there's a Spraying Systems Data Sheet that gives useful information on suggested installations and types of nozzles to use. If you have a problem, write and let us know the application involved . . . and we'll send the Data Sheet that applies.



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And . . . for complete spray nozzle information, write for Catalog 24.

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LOW COST
Metering and Feed
**PUMP**

New pipe line metering feed pump is the ideal answer to metering, feeding, injection and other processes requiring positive displacement pumping . . . at a low cost. It is well-suited to pumping slurries and viscous materials.

Multiple inlet and discharge ports are particularly well-adapted to pumping from one circulating stream to another. The packing gland is on the low pressure side; high pressure packing is eliminated. It is well-suited to continuous processes requiring incremental slug feeding. It is available in capacities to 1 GPM and in a variety of construction materials.

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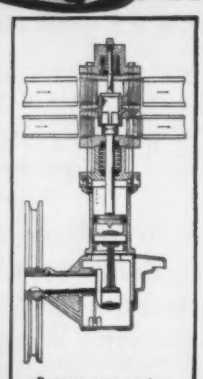

Pump cross-section

**SIGMAMOTOR Inc.**
22 NORTH MAIN STREET, MIDDLEPORT N Y


# RECENT INVENTIONS

## PRODUCTS

**Baking Powders** Containing a Carbonate, Calcium Sulfate and Alkali Metal Acid Pyrophosphate.—Standard Brands, N.Y.C. No. 2,870,017.

**Refrigerated Batter,** Stabilized by Heating to 145-185F., Cooling Below 145F. — General Mills, Minneapolis. No. 2,870,026.

**Swiss-Type Cheese,** With Curd Subjected to Vacuum Before Salting and Curing.—National Dairy Products Corp., NYC. No. 2,871,126.

**Cheese Spread** Comprising Milk Solids, Emulsifying Agent, Water, Hard Cheese and Milk Fat. — Standard Brands, N.Y.C. No. 2,871,127.

**Cheese Paste** Marbleized With Green Mold Filaments.—Ercole Locatelli, Robbio, Lomellina, Italy. No. 2,872,324.

**Meat-Like Spread** Consisting of Oil-Protein Flakes, Aqueous Fat Emulsion.—Lever Brothers, N.Y.C. No. 2,874,049.

**Dough Adjunct** Comprising Calcium Peroxide, Brewer's Inactive Yeast and Proteolytic Enzyme.—Bred-Ade Corp., Oak Park, Ill. No. 2,875,064.

## PROCESSING

**Cold-Processing of Citrus Fruit** in absence of Air and Using Cored Fruit, Juice, Skin and Pulp.—G. T. Lewis, Jacksonville, Fla. No. 2,859,118.

**Dye-Marking Casings** Prior to Stuffing So As to Spot Unpeeled Franks After Casing-Skinning Operation.—Tee-Pak, Inc., Chicago. No. 2,860,052.

**Water-Fogging Carcass Meat** During Chilling to Reduce Shrink Loss.—Swift & Co., Chicago. No. 2,860,056

**Vacuum-Concentrating Milk** Between 110 and 150F. by Repeated Passage Through Heat-Exchanger and Cooling.—Carrier Corp., Syracuse, N. Y. No. 2,860,988.

**Heat-Coagulating Ground Meat** and Forming to Desired Shape.—The Rath Packing Co., Waterloo, Ia. No. 2,860,991.

**Producing Swiss Cheese** by Salting, Separating, Pressing, Moistureproof Wrapping for Cold, Then Warm-Room Curing.—Borden Co., N.Y.C. No. 2,864,704.

**Foam Stabilizing Beer With Non-Toxic Cobaltous Salts** — Alfred Jorgensen's Gaeringsfysiologiske Laboratorium, Copenhagen, Denmark. No. 2,865,755.

## PACKAGING

**Sausage Canner** Comprising Series of Moving Open-End Product Holders, and Means for Positioning Cans to Receive Sausages Ejected From Them. —Marlen Equip. Corp., Overland Pk., Kan. No. 2,864,216.

**Pie Packaging Machine** With Indentations to Receive Plastic Sheet and Products and Heat-Sealing, Film-Cutting Head.—C. A. Jones, Jr., San Leandro, Calif. No. 2,864,221.

**Meat Cutter-Cooker** With Rotating Bowl, Knives and Heating Facilities.—Cincinnati Butchers' Supply Co. No. 2,864,302.

**Transparent Wrapper** Incorporating Selective Light Screen to Prevent Loss of Foods' Riboflavin.—Waxed Paper Merchandising Council, Inc., Chicago. No. 2,864,709.

**Heat-Sterilized Preservation** of Products in Sealed Containers. —James Dole Engineering Co., San Francisco. No. 2,870,024.

## EQUIPMENT

**Machine** for Preparing and De-aerating Alimentary Paste Dough.—P. Ambrette, Westbury, N.Y. No. 2,868,144.

**Egg Grader** Comprising Paired Scales to Weigh and Discharge Eggs of Different Weights.—R. S. Davis, Otsego, Mich. No. 2,872,040.

**Fowl Deheader** Having Guide Frame and Circular Rotatable Cage.—B. J. Boykin, El Dorado, Ark. No. 2,874,402.

**Aseptic System** for Canning Products Under Pressure.—W. F. & John Barnes Co., Rockford, Ill. No. 2,874,523.

**Unloader** for Automatically Discharging Pans From Oven. —Capital Products Corp., Mechanicsburg, Pa. No. 2,874,650.

## INGREDIENTS
**For the Food Processor**

**CARROT OIL**

**makes food**

**golden yellow**

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A activity.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A activity of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

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**205 Broad St., South Whitley, Ind.**

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*From 8mm to 4x5 transparencies*

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**WANTED**
### AIR SEPARATOR
**Five to eight feet, Double Whizzer, good condition.**

W-1910, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

**FOR SALE**
2—80 HP Eclipse McKee "Supermatic" Horizontal Steam Generators. 105 lbs. working pressure. Scotch type Series STCGO, Portable—mounted on steel skids, gas or oil fired with combination burner unit, complete with all controls, motors, and blower. Used less than one year. Can be used for low pressure by changing pop off valve. MFG. IN 1952.

**ESTES MACHINERY COMPANY**
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**Make us your Source for your Sales as well as for Good Buys.**

We are anxious to locate used Equipment to fill inquiries for Stainless Steel Kettles & Tanks; Horizontal Spiral Mixers; Fillers & Labelers, etc.

If you have anything for sale, send data to us. We can help move same for you.

Ask for Bulletin A43 for latest listings.

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TAlbot 4-2050

8,000 gal. stainless Vertical Tank.
1,000 gal., 750 gal. stainless sanitary Vertical Tanks.
1,500 gal. stainless sanitary Vertical Vacuum Tanks with coil.
(6) 7,750 gal. and (6) 4,650 gal. horizontal lastiglas lined all welded Tanks.
(2) 13,000 gal. horizontal glass lined all welded Tanks.
(4) Shell and Tube Heat Exchangers 65 to 200 sq. ft. Stainless sanitary.
Atmospheric Double Drum Dryers, 42" x 120", 42" x 90", 32" x 72", 24" x 36".
6 ft. and 5 ft. dia. Stainless Vacuum Pans with condensers and pumps.
2,875 gal. and 2,500 gal. stainless sanitary truck tankers, insulated.

**BEST EQUIPMENT COMPANY, INC.**
1737 W. HOWARD ST. — CHICAGO 26, ILL.
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**BAKER PERKINS heavy duty jacketed, double arm, sigma blade mixers.**

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### Two (2) FMC Retorts
**Serial Nos. AE-2806 and AE-2807, together with twelve (12) Figure 495 perforated baskets. Excellent condition. Low price. Contact: Purchasing Department,**

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Hartford 1, Conn.

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**SWENSON**
**S.S. SPRAY DRYER**
10′ ID x 6′10″ straight side x 12′6″ cone. Complete with Pangborn Dust Collector.
***Priced To Sell***

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Disintegrators: Rietz RD 18-P, steel, 75 hp.
Dryers: Link Belt Meno Tube monel.
Dryers: Devine 2 x 4 vac. drum st. steel.
Dryer: Stokes vacuum 2-shelf model 51.
Filler: Pfaudler 12 pocket juicer, st. steel.
Fillers: liquid vacuum, siphon, gravity.
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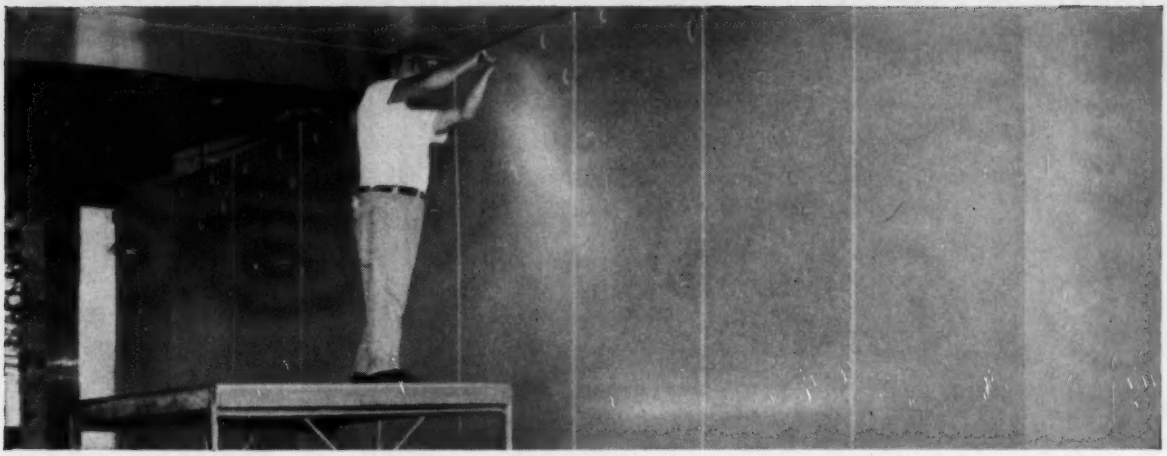

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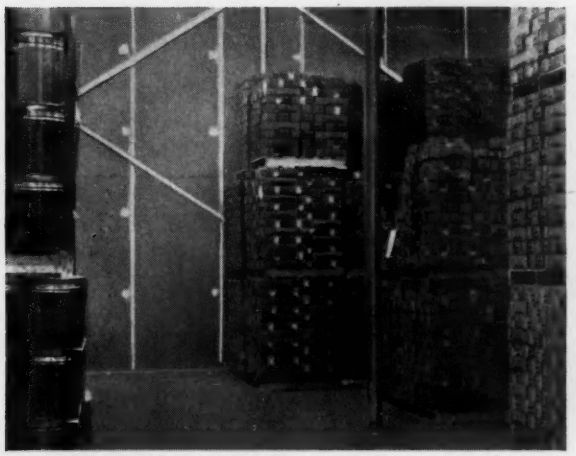

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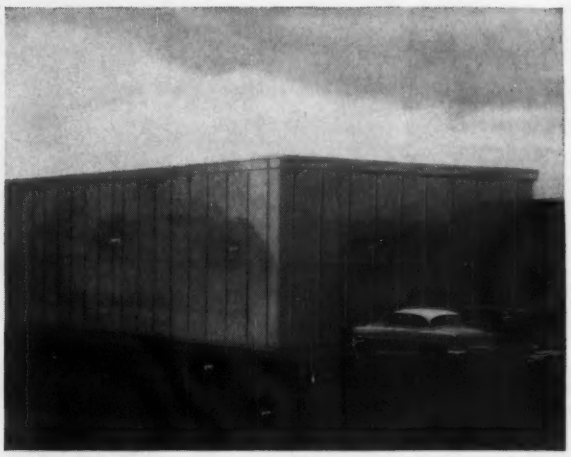

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| 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49* | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 |
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**Packaging machinery.** Descriptive lit., Wright Machinery Co.—470

**Screw cappers & fitment applicators.** Descriptive lit., Resina Automatic Machinery Co.—471

**Transwrap machine.** Information, Package Machinery Co.—472

### Packaging Materials

**Corrugated boxes.** Booklet, Union Bag-Camp Paper Corp.—473

**Formulas & tables for polyethylene film & bags.** 8-pg. booklet, U. S. Industrial Chemical Co.—474

**Polyethylene film.** 4-pg. Data Sheet, U. S. Industrial Chemicals Co.—475

### Construction, Insulation, Maintenance Materials

**Steel buildings.** Details, Butler Mfg. Co.—476

**Plywood, metal-faced.** Descriptive booklet, U. S. Plywood Corp.—477

**Stainless steel's cleanability.** Booklet ADV. 686C, Republic Steel Corp.—478

### Sanitation and Cleaning

**Insecticide sprayers.** Information, West Chemical Products—479

**Plant cleaning techniques.** Bulletin, Oakite Products —480

### Management

**Plant sites.** Site information, No. Carolina Dept. Conservation—481

See JOP for More

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